

COMPUTERWORLD

INSIDE

Product Spotlight — Relational DBMSs make a play for the big leagues. Page 63.

In Depth — AJAD puts users to work in design. Page 87.



Profile: Energetic, playful Frank Erbrick drives formation systems for UPS. Page 97.

Uniform preview:

— Private showings of low- and high-end Sun systems anticipated. Page 129.

— Tandy, DEC and three other firms to team up with integrated Unix desktop package. Page 128.

Bull backs down over controversial mainframe recertification policy. Page 4.

AS/400 upgrades viewed as fixes for performance problems. Page 6.

Unisys bolsters Unix lineup, page 128; pares down work force, page 103.

No major changes in store for IBM's PC strategy, Cannavino says in first public comments since taking over operations. Page 35.

HP buys into 3Com strategy

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Users of 3Com Corp. networks — which are typically maintained through resellers — are about to get some much-needed service and support relief under the terms of a broad-ranging alliance announced last week between Hewlett-Packard Co. and 3Com.

That agreement also promises to provide users with "scalable servers." The idea is to facilitate the transparent migration of network software from OS/2 servers to larger minicomputer-based servers as networks grow both in size and volume of traffic.

On the surface, the partnership amounts to a swap of 3Com's LAN Manager-based 3+ Open network software in exchange for HP's multivendor service and Unix port of LAN

Manager. But the announcement also encompasses long-term joint development and marketing agreements in six technology areas, including network management and electronic mail.

Neither 3Com nor HP would

provide much in the way of specific release dates, other than to say that the jointly developed products will begin to ship in the second quarter.

"I suspect these products will roll out pretty rapidly over the
Continued on page 12

Novell mirrors service bid

Novell, Inc. rolled out agreements with four large service companies last week in an effort to enhance its support to major end users. HP, Xerox Corp., BancTec, Inc. and Federal Technology Corp. will all work to provide Netware users with national, and eventually international, support. Through their alliances, these service organizations will enhance, if not replace, Novell dealers' ability to provide the support needed by large Netware users with installations in disparate locations. Novell denied that the timing of its announcement was influenced by the report a day earlier that HP had purchased an equity stake in 3Com and would provide worldwide service and support for 3Com products.

PATRICIA KEEFE

Feds get tough on FTS-2000

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The General Services Administration, taking a more aggressive oversight role, has suspended 18 federal procurements for wide-area networks to determine whether they duplicate services in the new Federal Telecommunications System 2000 contract.

The goal of the 30-day review is to ensure that agencies do not bypass the centralized FTS-2000 network by launching their own data networks.

The GSA suspension list includes nationwide data networks — each worth well over \$10 million — proposed by the Departments of State, Interior, Justice and Labor, as well as the Veterans Administration, the Federal Aviation Administration and the federal courts.

The federal user and vendor communities were stunned by the Feb. 17 announcement, which could lead to major revisions of network procurements already under way and close to
Continued on page 10

DG looks to crash workstation party

BY JAMES DALY
CW STAFF

WESTBORO, Mass. — Joan Rivers once offered a small tip for making a big impression: Enter talking.

Data General Corp. has apparently taken the comedian's advice to heart and will burst into the workstation market today with a series of machines and servers that give it a lot to talk about: processing speeds of more than 17 million instructions per second for less than \$8,000, according to company sources.

The four-model Unix-based workstation series and an accompanying pair of servers are based on Motorola, Inc.'s 88000 reduced instruction set computing microprocessor and may quickly help DG wrest the workstation price/performance leadership from Digital Equipment

Corp. Last month, DEC announced the Decstation 3100, which is capable of processing at 14 MIPS and is base-priced at \$11,900 [CW, Jan. 16].

Although the line will remain a paper tiger until becoming gen-

erally available this summer, analysts said it is an important addition for DG. In the past several years, the firm has suffered a financial bruising as the user base for its proprietary MV/Eclipse
Continued on page 129

ISDN-hungry users finding they're on a restricted diet

BY ELISABETH HORWITT
CW STAFF

With basic PC-to-host connectivity under their belts, early Integrated Services Digital Network users are just starting to look for products to support high-speed file transfer and sophisticated data/voice applications — only to discover a black hole.

The growth of a potentially booming market is being stunted by the lack of a software interface standard that would allow third-party products to migrate easily among different vendors' ISDN communications equipment, vendor sources said. Although the North American ISDN Users Forum hopes to get vendors to agree to a de facto in-

terim standard, official standards bodies have only just started to address the problem, according to the sources.

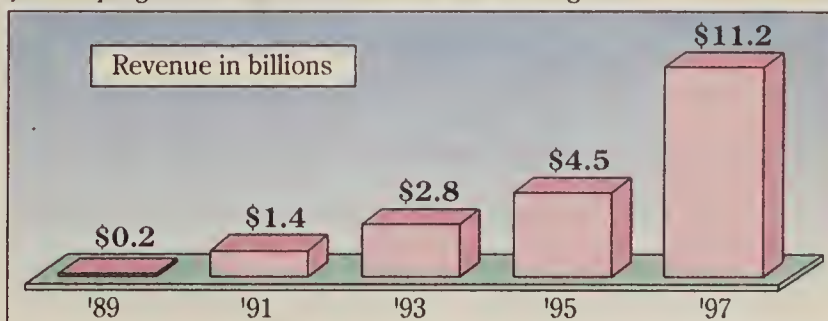
Meanwhile, many ISDN installations are making do with

personal computer communications software products that were originally developed for RS-232 connections but can run adequately over an ISDN connection. The drawback is that such products cannot take advantage of ISDN's full functionality, according to Steve McGaw, area manager at Southwestern Bell Corp.

Continued on page 16

The future is not now

Continued deregulation and the growth of intelligent carrier networks should foster rapid growth in the ISDN services market through the next decade



SOURCE: THE EASTERN MANAGEMENT GROUP
CW CHART: FRANK C. O'CONNELL

IN THIS ISSUE

AS/400 boosters. IBM enhances midrange's image with announcements of expanded low-end capabilities, memory upgrade price cuts, a high-end model and other options. Page 6.

Happy anniversary. Five workstation vendors celebrate Unix's 20th with a low-cost loaded software package for 80386-based micros. Page 128.

NEWS

- 4** Disgruntled Compaq cuts off Businessland.
- 4** Wyse climbs into driver's seat after Businessland-Compaq crack-up.
- 4** Bull retracts potentially damaging maintenance policy.
- 6** Upcoming IBM office software will comply with SAA.
- 6** Leading Edge potential buyer bows out.
- 8** Customs net keeps watch over U.S. borders.
- 8** DEC's Aquarius water-cooled mainframe project may not be washed up.
- 10** Microsoft demonstrates 80386-supporting products.
- 12** Hewlett-Packard and 3Com spell out alliance intentions.
- 128** IBM's Unix commitment comes under fire.
- 128** Unisys increases Unix-based line by three.
- 129** Sun plans 8 MIPS and 20 MIPS Sparc introductions.
- 129** Motorola RISC consortium backs 26 new software entries.

SYSTEMS & SOFTWARE

- 23** IBM's VM will soon join ESA camp.
- 23** Pharmacies verify insurance claims with net system.
- 23** Latest Sequoia machine packs twice the power in the same price range.

MICROCOMPUTING

- 31** Users seek more pieces of OS/2 pie.
- 31** Micro makers aggressively pitch to brokerage firms.
- 31** Executive information systems are growing on senior officers.



Flexibility and load handling? Page 63.

NETWORKING

- 51** AT&T's Tariff 12 custom service takes control.
- 51** E-mail services are giving in to customers' X.400 demands.
- 51** AT&T ISDN studies are paying off in clients.

MANAGEMENT

- 97** United Parcel Service MIS chief follows up-through-the-ranks credo.
- 97** Users are increasingly advising IS on systems overhauls.

COMPUTER INDUSTRY

- 103** Sequent chief outlines OLTP offensive.
- 103** Merger rumor mill powered by user demands.
- 103** Unisys cutbacks include 1,700 U.S. jobs.

Quotable

"It is very peculiar that you throw a life raft to a drowning man and the drowning man says it isn't a good enough life raft."

STEWART FASON
PCSYSTEMS

On Leading Edge trustee's refusal to accept Fason's buyout offer for the troubled firm. See story page 6.

COMPUTER CAREERS

- 110** Pick popularity spells job opportunities.

TRAINING

- 120** Hypercard may be blown out of proportion.

TRENDS

- 130** Executive information systems gaining momentum, study shows.

PRODUCT SPOTLIGHT

- 63** Relational DBMSs set out to prove themselves as heavyweight contenders. By Alan Radding.

IN DEPTH

- 87** How IS can automate the collection of user knowledge. By James D. Kerr.

OPINION & ANALYSIS

- 17** Friscia sees IBM jockeying for plant-floor position.
- 21** Newquist puts the brain machine through its paces.
- 23** Bozman tries to settle Amdahl-NAS feud.
- 31** Barney listens for Lotus lip service.
- 51** Nolle reveals the dark side of the regional carrier force.
- 97** Brittain thinks today's techies should take it personally.
- 103** Noonan wants employees to burst firms' over-inflated balloons.

DEPARTMENTS

- 8** News Shorts
- 20** Editorial
- 101** Calendar
- 120** Marketplace
- 127** Stocks
- 130** Inside Lines

NEWS

IRS systems overdrawn

GAO estimates upcoming overhaul at \$3B to \$4B

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The single biggest management challenge facing the Internal Revenue Service is replacement of its aging computer systems for tax processing, the U.S. General Accounting Office (GAO) told a congressional hearing last week.

The report prompted Sen. David Pryor (D-Ark.), who chaired the hearing, to declare that the outdated IRS computer systems are headed for a "train wreck" in the mid-1990s.

The IRS, acknowledging that its 1960s-era systems are inefficient and will run out of capacity between 1992 and 1994, has launched a major replacement program called the Tax System Redesign. The GAO estimated the cost at between \$3 billion and \$4 billion.

Pryor questioned whether the IRS would be able to handle such a big project in light of audits showing poor financial controls and mistakes in other computer projects.

So far, the Tax System Redesign has been slow going, and the

date for full-scale implementation has slipped from 1995 to 1998, Pryor said.

"This modernization is a massive undertaking, even compared with many of the large systems we hear about in government and industry today," the GAO spokesman testified. The GAO suggested that one executive be given full-time responsibility for managing the technology overhaul and that the IRS raise the technical expertise of all its senior managers.

"IRS has preliminary design concepts," the GAO observed, "but the real work of modernization is still ahead." The design envisions a corporate database for widely used tax administration information, departmental systems for department-specific information, a nationwide network, electronic filing of tax returns and optical-disk storage.

The IRS wants the new system to be portable, flexible and expandable. "Our current system is none of those things," said Margaret O'Rourke, director of information systems design at the IRS office, at a conference last year.

1-2-3 Release 3.0 bound for 5,000 beta-test sites

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. launched what may be the largest beta test ever when it shipped out prerelease copies of 1-2-3 Release 3.0 last week.

The massive beta-test release is the first good news for the firm since it was besieged by product delays and criticized by an increasingly skittish user base. Since early last year, Lotus' image as a technology leader has been harmed by unfulfilled promises. This could change with a warm Release 3.0 reception.

Barring unforeseen bugs, the product — announced 23 months ago — should make its June 1989 deadline. Lotus and its 5,000 corporate testers now have three months to test, debug and shrink-wrap the long-awaited upgrade.

Despite some user defections and growing unease, Lotus customers remain a loyal lot. Many are so familiar with 1-2-3 that switching to another product would be like getting a divorce, said Ron Goldfarb, a new-technology evaluator at Pratt & Whitney.

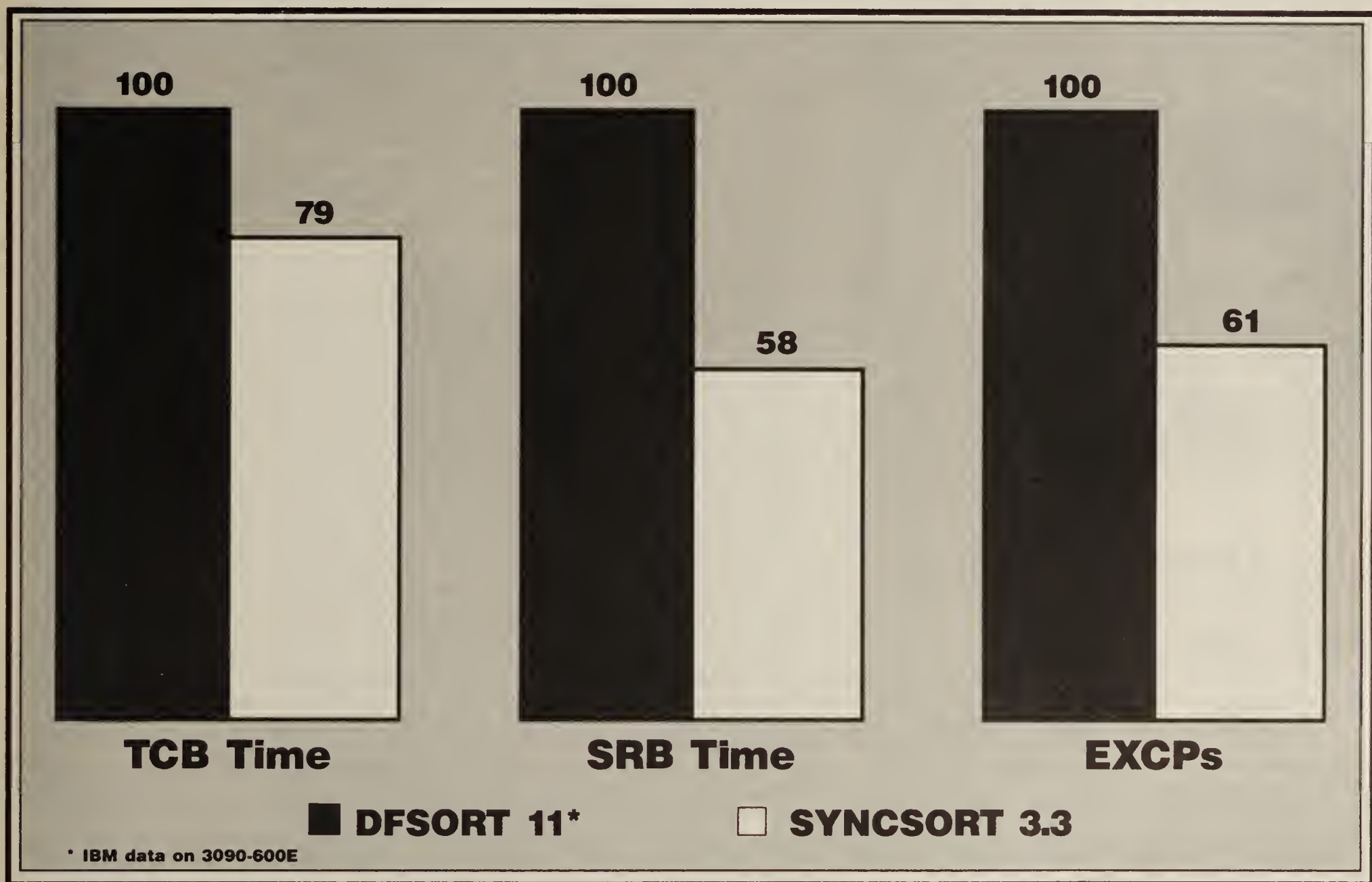
Lotus has forsaken millions in upgrade fees to hang onto users. The firm has been offering a free upgrade to Release 3.0 for all Release 2.01 purchases since September 1988.

Like General Motors Corp. putting cars on the showroom floor but refusing to open the hood, Lotus is still providing scant Release 3.0 details, such as what hardware is required to run the product. However, industry sources and a Lotus insider concede that the MS-DOS version will require a so-called DOS Extender and will not run on Intel Corp. 8088-based machines. Lotus concedes that it is targeting Intel 80286 machines and above but will not confirm the DOS Extender component.

DOS Extenders allow MS-DOS programs to take advantage of the protected mode of the 286 and 386, a feature that provides memory greater than 640K bytes. The software will also run under OS/2 and may be the first truly important OS/2 application to ship.

Disks began shipping to an initial group of 70 sites last week. That group will be expanded to include more than 5,000 users, according to Lotus officials.

DATASPACING & HIPERSORTING with SyncSort in ESA



ESA Exploitation à la SyncSort

If you want to maximize your ESA investment, then find out why SyncSort is the better choice.

Call us at (201) 930-8200 to arrange for a comprehensive benchmark on your system.

syncsort
INC.

Where Performance Is the Issue.

Compaq drops Businessland

BY JULIE PITTA
CW STAFF

HOUSTON — An ongoing debate over pricing discounts has resulted in Compaq Computer Corp. severing its ties with computer reseller Businessland, Inc., according to executives at both companies.

"Businessland has said they need to have preferential treatment compared with our other resellers," said Michael Swavely, Compaq sales and marketing vice-president. "Any kind of preferential treatment is against our policy and is nonnegotiable."

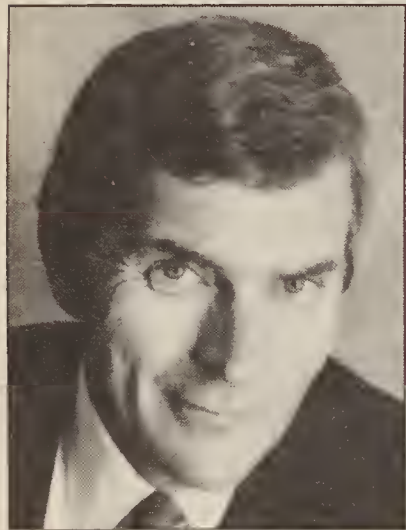
Despite recent tensions between the companies, Businessland President David Norman expressed surprise at the Com-

paq decision. "We helped take Compaq into corporate America," Norman said. "We consider them a good long-term strategic partner." Sales of Compaq systems have consistently accounted for 15% of Businessland's revenue over the past 18 months, he noted. He said a decision has not been made to carry another personal computer vendor to make up for the loss of Compaq.

Sales to Businessland accounted for about 7% of Compaq's revenue last year, Swavely said. Computerland Corp., Compaq's largest customer, accounted for between 10% and 12% of its revenue in 1988, he noted.

Notwithstanding the volume of Compaq systems sold through the retail chain, Swavely said, "I don't believe Businessland is pushing our product and hasn't for some time. I think they only sell our products when the customer asks specifically for Compaq and they can't sell them something else."

Norman said IBM and Apple Computer, Inc. extend better terms to Businessland than Compaq does. Both IBM and Apple offer a greater amount of expense abatement funds to help the reseller offset training costs, the purchase of demonstration equipment and advertising, Norman said.



Businessland's Norman

Bull retracts troubling maintenance policy

BY NELL MARGOLIS
CW STAFF

Bull H. N. Information Systems, Inc. last week withdrew a controversial maintenance policy that had threatened to shut down the secondary market in large-scale Bull computers and damage the primary market as well.

Computer resellers and industry association leaders, all of whom have raised their voices against what one called Bull's "infamous C-12 policy amendment" since its adoption eight months ago, nevertheless agreed that Framingham, Mass.-based IDC Financial Services Corp. dealt the C-12 amendment its death blow.

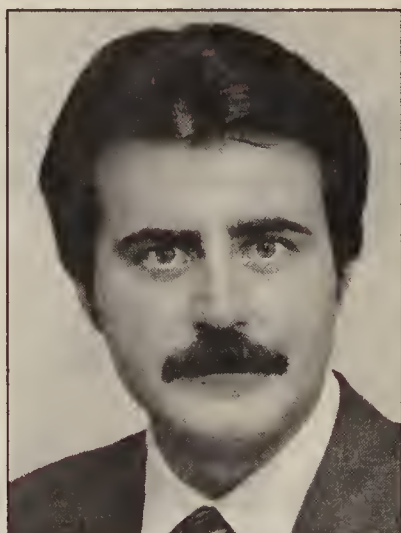
In a letter dated Feb. 6, Charles Greco, the president of IDC Financial Services, which is an acknowledged leader in forecasting the residual value of computers, notified Bull of IDC's decision not to publish residual value projections for Bull's Honeywell 9000 series and to consider stalling all forecasts for Bull wares until the company clarifies

C-12. With its computers con-signed to residual-value limbo, Bull would be effectively frozen out of the aftermarket along with everyone else.

In short, here is what C-12 did and how it died.

Last June, Bull (then Honeywell Bull, Inc.) altered its 12-year-old maintenance policy to stipulate that any large Bull machine off ordinary maintenance for more than 30 days or removed from its site for more than 10 days would have to be shipped — at the owner's expense — to the company's Phoenix-based plant for maintenance recertification. According to the policy, Bull could decide whether and to what extent a computer required refurbishing in order to be recertified. Bull would then do the refurbishing and bill the owner.

Apparently, no written guidelines were made available. Confusion and dismay spread as lessors — who depend on the prospect of aftermarket sales to make their leasing deals feasible — and resellers realized that potentially hefty and virtually incal-



Compaq's Swavely

William Keiper, president of Microage Computer Stores, Inc., said the terms he receives from Compaq are on par with other vendors.

"Compaq is a good gross-margin-producing product," Keiper said. "Our experience has been that Compaq has been very fair and evenhanded in its dealings with Microage."

Wyse eyes the prize

Wyse Technology stands to be the big winner in what is being called a no-win dispute between Compaq and computer reseller Businessland. It introduced an Intel Corp. 16-MHz 80286 PC last week priced at \$2,899 for an entry-level version and a 25-MHz 80386-based system priced at \$8,599 for a base configuration. Wyse is also discussing the possibility of a Micro Channel-compatible system that Businessland would sell under its brand name.

After what Compaq officials said was a three-year dispute over pricing discounts and other terms, Compaq dropped Businessland as a reseller last week. Compaq systems accounted for about 15% of Businessland's nearly \$150 million in revenue and was one of four PC lines that Businessland carries. Other vendors include IBM, Apple and Wyse.

"We want to become a bigger part of their business," said Bernard Tse, chairman and chief executive officer at Wyse. "This offers us a great opportunity to do that." Tse said Businessland is among Wyse's top three customers.

An increase in sales to Businessland could resuscitate Wyse's flagging PC business. Last year, the company made a couple of strategic errors, raising system prices and failing to bring 386-based systems to market in a timely fashion. As a result, Wyse has been left with a large inventory of 286-based systems and is facing its first quarterly loss.

JULIE PITTA

culable costs were now going to come off the top of the resale value of any large-scale Bull. In a market in which IBM Credit Corp. has raised the competitive ante for lessors who primarily deal in IBM equipment, interest in dealing with other large companies — particularly Bull — has run high lately, said Kenneth Bouldin, president of the Computer Dealers and Lessors Association (CDLA).

Just as that interest mounted, however, "we find out that every machine that gets de-installed gets a trip to Phoenix and then gets robbed with a mask and a gun," Bouldin said. With the C-12 amendment, Bouldin said, Bull "was basically killing

Bill Lempesis, PC industry analyst at San Jose, Calif.-based market research firm Dataquest, Inc., said IBM and Apple negotiate reseller terms on a dealer-by-dealer basis, while Compaq has always had a two-tier pricing structure that it applies to all resellers.

Last week's action comes after several months of criticism leveled at Compaq by Businessland. Recently, Norman said his firm would do nothing to promote the Extended Industry Standard Architecture (EISA) being developed by Compaq and other PC clone makers in response to IBM's proprietary Micro Channel Architecture.

Swavely said Compaq's decision had little to do with Businessland's failure to publicly support EISA and that the decision was a result of a nearly three-year dispute between the two companies over specific terms.

Lempesis said Businessland stands to be the bigger loser. "If Compaq maintains its lead in the processor race, it means that Businessland won't have the hottest box," he said.

COMPUTERWORLD

Editor in Chief

Bill Laberis

Executive Editor

Paul Gillin

News Editor

Peter Bartolik

Assistant News Editor

James Connolly

Senior Editors

Clinton Wilder, Management
Elisabeth Horwitz, Networking
Patricia Keefe, Networking
Douglas Barney, Microcomputing
Stanley Gibson, Software
Michael Alexander, Microcomputing
Rosemary Hamilton, Systems
Nell Margolis, Industry

Senior Writers

Alan J. Ryan
Amy Cortese
William Brandel

Staff Writer

James Daly

New Products Writer

Sally Cusack

Features Editor

George Harrar

Senior Editors

Glenn Rifkin
Joanne Kelleher, Spotlight
and Executive Report
Michael L. Sullivan-Trainor,
Special Projects

Senior Writer

David A. Ludlum

Associate Editors

Deborah Fickling
Kelly Shea, In Depth

Assistant Editor

Sharon Baker

Researchers

Bonnie MacKeil
Kevin Burden

Chief Copy Editor

Mary Grover

Assistant Chief Copy Editor

Donald St. John

Features Copy Editors

Julie L. Cook
Joseph J. Fatton

Copy Editors

Cathleen A. Duffy
Richard R. Pastore
Joyce Chutchian

Art Director

Nancy Kowal

Graphics Specialists

Frank C. O'Connell
John B. York

Graphics Researcher

Laura O'Connell

Assistant to the Editor in Chief

Linda Gorgone

Editorial Assistants

Patricia Faherty
Lorraine Witzell
Megan Santosus

Rights and Permissions Manager

Sharon Bryant

News Bureaus

Mid-Atlantic

201/967-1350

Robert Moran, Correspondent

Washington, D.C.

202/347-6718

Mitch Betts, Bureau Chief

West Coast

415/347-0555

Jean Bozman, Bureau Chief

Julie Pitta, Senior Correspondent

J.A. Savage, Correspondent

Patrick Waurzyniak, Correspondent

Mary Elliston, Editorial Assistant

Computerworld Focus on Integration

Editor

Ann Dooley

Managing Editor

Lory Zottola

Senior Editor

Stan Kolodziej

Senior Writer

Helen Pike

Art Director

Tom Monahan

Intern

Mark Breibart

IDG News Service

Kathleen A. Gow, Director

Main Editorial Office

Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
508/879-0700

Subscriptions: 800/669-1002

All Fire. No Smoke. ORACLE® Version 6.

*"ORACLE Version 6
gives us up to six times
faster throughput."*

Jerry Goersch, Vice President of R&D
International Financial Systems, Ltd.

ORACLE Version 6 Performance

- 265 tps on MVS
- 124 tps on UNIX
- 49 tps on VAX/VMS

*"Our early benchmarks of
ORACLE Version 6 show a five-fold
increase in systems throughput
for multiple users."*

David Hart, Executive Director for Computing
University of Houston-Clear Lake

*"We use ORACLE to run our
company. The real application
performance of ORACLE Version 6 on
our advanced parallel-processing
architecture is at least as good as
the benchmark improvements
would indicate."*

Casey Powell, Chairman and CEO
Sequent Computer Systems, Inc.

When we launched ORACLE® Version 6 with the transaction processing option, we surprised everybody with our benchmark results. ORACLE set world records on all major platforms — mainframes, minicomputers and UNIX-based workstations. And now, our customers are finding even more dramatic performance increases in their *real-world* applications.

Our benchmarks have received a good deal of attention. But the real performance test is in the real world with your applications. We invite you to experience for yourself ORACLE Version 6, the world's fastest DBMS. To register for the next free seminar in your area, call 800-345-DBMS, extension 8120. Or write for our complete benchmark kit. ORACLE Version 6 is *all fire*.

ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

Call 1-800-345-DBMS, ext. 8120 today.

Copyright © 1988 by Oracle Corporation.
ORACLE is a registered trademark of
Oracle Corporation. Other companies
mentioned own numerous trademarks/
registered trademarks. TRBA

20 Davis Drive, Belmont, CA 94002 • World Headquarters
(415) 598-8000 • ORACLE Canada (800) 387-4407 (except
Quebec) • Quebec (514) 337-0755 • ORACLE Systems
Australia 61-2-959-5080 • ORACLE Europe 44-1-948-6911 •
ORACLE Systems Hong Kong 852-5-266846

U.S. SEMINAR SCHEDULE

AL	Birmingham	Mar 8r
AR	Little Rock	Mar 16
AZ	Scottsdale	Mar 9a Apr 11af
	Tucson	Apr 18
CA	Costa Mesa	Mar 23m Apr 25f
	La Jolla	Apr 13a
	Los Angeles	Mar 14fm Apr 20af
		Apr 25g
	Ontario	Mar 21fm
	Redwood City	Apr 27g
	Sacramento	Mar 21f
	San Diego	Mar 16cf
	San Francisco	Mar 29cf Apr 25ar
	San Jose	Mar 9fu Apr 12ar
	Santa Clara	Mar 9fu
	Universal City	Apr 6cfm
CO	Denver	Mar 30g
	Englewood	Mar 7afp Apr 18ac
CT	Farmington	Mar 7f
	Stamford	Mar 21fm
DC	Washington	Mar 16g Apr 13g
FL	Ft. Lauderdale	Mar 8t
	Tampa	Mar 22fu
GA	Atlanta	Mar 23v Apr 26m
	Savannah	Apr 27f
HI	Honolulu	Mar 14fp
IA	Des Moines	Apr 20t
ID	Boise	Apr 13fr
IL	Chicago	Mar 21fu Apr 18afp
	Rockford	Apr 11
	Springfield	Apr 20r
IN	Indianapolis	Mar 22fm Apr 25r
KY	Lexington	Mar 21c
	Louisville	Apr 4f
LA	Baton Rouge	Apr 21c
	New Orleans	Mar 31am
MA	Boston	Apr 20fm
	Burlington	Mar 15af
MD	Baltimore	Apr 12cf
	Bethesda	Mar 9ga*
	Columbia	Mar 15p
ME	Augusta	Apr 18t
	Portland	Mar 2f
MI	Dearborn	Apr 4f
	Grand Rapids	Mar 8fm
	Troy	Mar 7fm
MN	Minneapolis	Mar 14fp Apr 11mv
MO	St. Louis	Mar 9fm Apr 13v
MS	Jackson	Apr 18t
NC	Charlotte	Mar 22c
	RTP	Mar 7r
	Raleigh	Apr 19m
NE	Omaha	Apr 6f
NH	Bedford	Mar 14
NJ	Iselin	Mar 30fm
	Princeton	Mar 15f Apr 19ar
	Secaucus	Mar 2f Apr 19f
NM	Albuquerque	Mar 7f
NY	Albany	Apr 18ar
	Amherst	Mar 28ap
	Binghamton	Apr 4
	Melville	Mar 15fu Apr 11am
	New York City	Mar 8v Mar 22f
		Apr 5pv Apr 19f
	Rochester	Apr 13p
OH	Beachwood	Mar 7r Apr 5fu
	Cincinnati	Mar 23fu
	Columbus	Mar 9f
OK	Oklahoma City	Apr 19c
	Tulsa	Mar 15t
OR	Portland	Mar 14fm
PA	Harrisburg	Apr 6
	King of Prussia	Mar 31r
	Philadelphia	Apr 10fm
	Pittsburgh	Mar 15fu
	Scranton	Apr 19t
SC	Charleston	Mar 9fr
	Columbia	Mar 23m
	Greenville	Apr 13f
TN	Memphis	Apr 19f
	Nashville	Mar 15r
TX	Austin	Mar 2r
	Dallas	Mar 7cf Apr 4ft
	Houston	Mar 9afp Apr 6fc
	San Antonio	Mar 3t Mar 28g
UT	Salt Lake City	Mar 16m Apr 26c
VA	Richmond	Apr 4t
VT	Burlington	Apr 6
WA	Seattle	Mar 29ar
	Spokane	Apr 25f
WI	Milwaukee	Mar 8f Apr 26t

For Canadian Seminars

Call (800) 387-4407, except in
Quebec, call (514) 337-0755.

The following key indicates additional afternoon
seminars that are offered with these seminar dates:

- a Integrating Macintosh into Corporate Network
- c CASE Tools
- f Oracle Financials
- m Computer Integrated Manufacturing (CIM)
- p PC Workgroup Solutions
- r SQL*Reportwriter
- t ORACLE Transaction Processing
- v Value Added Relicensors (VARs)

Please note:

g These seminars are directed to the Federal
Government only.

* Only the indicated afternoon seminar is held
on these dates

Attn.: National Seminar Coordinator
Oracle Corporation • 20 Davis Drive
Belmont, California 94002
1-800-345-DBMS, ext. 8120

☐ My business card or letterhead is
attached. Please enroll me in the
FREE ORACLE seminar to be held

at:

on:

COMPUTERWORLD

IBM shines up AS/400 family

BY ROSEMARY HAMILTON
CW STAFF

IBM polished up its Application System/400 line with a host of options last week, including expanded low-end capabilities, steep price cuts on memory upgrades for higher end models and a high-end system.

But users and consultants contacted last week said the announcement was no ordinary introduction of enhancements. Instead, they claimed, it was IBM's response to reports of performance problems that are showing up on all models of the AS/400 when users run the systems with standard memory configurations.

An IBM spokesman said he

was aware of industry speculation about the AS/400's performance problems but said it was "absolutely not true."

Users and consultants said the AS/400, with its rich and complex operating system, has proven to need more than the standard or typical amount of memory. This problem surfaced last year at the low end when machines were running with minimum memory configurations. But observers now say that higher end models will also slow down when running more complex applications such as AS/400 Office.

The IBM spokesman said last year's reports of a low-end memory problem was a separate issue involving customers not running

in native mode. He added that there have been no reports of problems on higher end models. "Nobody said they weren't getting expected performance on a B30 or above," he said.

"We're upgrading our memory now to get more efficiency out of Office," said Ron Cipolla, MIS director at Kendall Co. in Boston, which is running an assortment of AS/400 models. "It was running poorly, but we hadn't originally configured our systems to include Office."

May have been problems

Cipolla said that he does not believe IBM had a big problem on its hands but that other users may have encountered difficulties. "Anytime IBM drops memory prices this early [in a product's life], you could believe there's been problems," he claimed.

John Logan, an analyst at Aberdeen Group in Boston, said IBM "essentially tried to do too much" with the AS/400. "The problem comes when running multiple applications, particularly Office. The memory just can't swap programs in and out fast enough," he said.

Logan and other observers pointed to several pieces of last week's announcement that can be seen as IBM's way of correcting problems.

For example, the maximum memory configuration of the B10 and B20 models — the source of user woes last year — has been officially boosted. The maximum configuration on a B10 is now 16M instead of 8M bytes. The B20's maximum memory can be boosted from 16M to 28M bytes.

Last year, several B10 and B20 users complained to IBM that they suffered poor perfor-

Branching out

IBM's expanded AS/400 Model B20 increases user options for memory, storage and I/O cards

	Base model	With expansion unit
Main storage (in bytes)	4M to 16M	4M to 28M
Number of system I/O buses	1	2
Number of available card slots	4	9
DASD capacity (in bytes)	630M to 945M	630M to 2.2G
Typical number of users	8 to 20	12 to 30
Price	\$44,000	\$53,800

*Includes operating system, disk and tape

SOURCE: IBM
CW CHART: FRANK C. O'CONNELL

mance when running in System/36 mode with a minimum memory configuration. At that time, IBM offered them an additional 4M bytes of memory to be used free of charge for one year.

Nick Blattner, a software engineer at Emerald Technology, Inc., which took a 4M-byte loaner from IBM last year, said the change in the B10's maximum configuration "tells me that there was just a miscalculation by IBM."

For midrange and high-end users, one way to get better performance is to add memory. This can now be done with much lower costs.

The IBM spokesman said the price cuts came about because of manufacturing efficiencies. Last week, the cost of memory upgrades for higher end models was reduced to \$1,500 per megabyte from \$2,500. Furthermore, users can trade in additional memory cards that they already purchased for the higher price and receive credit toward the purchase of a new memory card.

For example, if B40 users purchased an additional 4M-byte card prior to the announcement, they paid \$10,000; it would now cost \$6,000. If they purchased an 8M-byte card now, they

would pay \$12,000 instead of \$16,000. If they traded in their 4M-byte card for the new 8M-byte card, they would pay only \$6,000, the difference between the new cost of the 4M-byte card and the 8M-byte card.

IBM also boosted the performance at the high end with the new B70 model primarily by reworking the 16M-byte memory cards used with the high end, according to Aberdeen's Logan.

The B70 also sports a faster processor. But the new 16M-byte memory card allows users to achieve a faster access time to memory, moving from 80 nsec, which is the speed achieved with the 16M-byte card on the B60, to 65 nsec.

Not all of IBM's announcement focused on memory. The company breathed new life into the B20 model with the introduction of an expansion unit that will sell for \$9,800. Approximately the size of the main system unit, the unit effectively doubles the capabilities of the B20.

Without this option, B20 users requiring more horsepower would have been forced to make a switch to a B30, which would have required a complete system swap; unlike the rest of the line, the B10s and B20s are not rack-mounted configurations.

Reaching up

When further options become available, the AS/400 Model 70 will offer more memory, more workstations attached and more communication lines than the Model 60

	B60	B70
Relative performance ¹	5.5	7.3
Main storage (in bytes)	32M to 96M	32M to 96M
Maximum number of I/O card slots	71	71
Maximum DASD capacity (in bytes) with 9332 Model 400 with 9332 Model 600 ²	27.2G 38.4G	27.2G 38.4G
Maximum number of workstation controllers	12	15 ³
Maximum number of communication lines	32	48 ⁴
Price (includes operating system)	\$284,500	\$379,000

¹ Model B10 (8M-bytes main memory, 945M-bytes disk storage) equals 1

² Available in June ³ Available Q4; currently 12 ⁴ Available Q4; currently 32

SOURCE: IBM
CW CHART: FRANK C. O'CONNELL

PC Systems pulls out of Leading Edge deal

BY ALAN J. RYAN
CW STAFF

RIVIERA BEACH, Fla. — Stewart Fason, owner of PC Systems, Inc., last week withdrew his offer to purchase the Leading Edge name and logo from financially troubled personal computer cloner Leading Edge Products, Inc. in Canton, Mass.

Fason had originally agreed to pay \$921,000 for the Leading Edge name and logo, which was approximately the amount Leading Edge owed him when it stopped shipping computers to dealers who had prepaid for them earlier this year.

Fason said the deal collapsed when Steven Gray, managing director of a Boston-based financial consulting firm and the court-appointed Chapter 11 trustee for Leading Edge, did not agree to the new terms he proposed, which included allowing him to ship to dealers some

\$16 million worth of Leading Edge computers that are currently warehoused in Los Angeles.

According to Fason, Gray told him he should send \$5 million to \$10 million to Leading Edge to secure the release of those machines and that Leading Edge telemarketers would handle the distribution.

Fason said he refused to accept Gray's terms. "It is very peculiar that you throw a life raft to a drowning man and the drowning man says it isn't a good enough life raft," Fason said.

In a prepared statement, Gray said his immediate objective is to engage a managing agent to work on his behalf to fund and operate the firm until a reorganization plan is confirmed by the U.S. Bankruptcy Court.

"This approach could result in the agent's eventual ownership of Leading Edge Products," Gray said.

Exec says SAA office tools imminent

BY STANLEY GIBSON
CW STAFF

ATLANTA — IBM is set to announce an integrated office software package soon that is compliant with its Systems Application Architecture, according to IBM Vice-President Earl Wheeler, who has primary responsibility for SAA.

Although the widely anticipated software is often referred to as SAA Office, Wheeler did not use that name, nor did he elaborate on what he meant by "soon." An IBM spokesman declined to comment on Wheeler's remarks but did say that no such announcement is planned for this week.

Wheeler described the integrated software as the "first integrated SAA product" while

speaking at the general session of the Knowledgeware, Inc. User Conference here last week. The executive told some 800 attendees that the software will offer document preparation, electronic mail, decision support and an iconic interface. In addition, it reportedly will have documented interfaces and will contain "the next level" of Common User Access, a graphical user interface.

Independent software vendors will have many applications ready the day the office software is announced, Wheeler said. Peter Morgan, vice-president of marketing at Software 2000, a Hyannis, Mass.-based vendor of financial and human services software for the AS/400, said his firm will attend the announcement, although he could not specify the date. Software 2000

is a member of the IBM Business Partner program.

Morgan said he attended a briefing given over IBM's field television network for IBM personnel and business partners last week. During the broadcast, IBM sales representatives were advised they could begin selling the office software to customers.

Morgan said the broadcast also discussed AS/400 Debit/Credit benchmark results that IBM has in hand. Although an IBM spokesman denied that the company has conducted Debit/Credit benchmark tests on the AS/400, one analyst said IBM admitted to him that the results exist. "IBM says they have them but won't release them," said John Logan, executive vice-president at Aberdeen Group in Boston.



VM
SOFTWARE INC.

 **SYSTEMS
CENTER**

We've
done
more
than
change
our name.

**We've grown from
a brilliant specialist
into a high-energy
resource for multiple
environments.**

As VM Software, we built an unmatched reputation for delivering powerful solutions to the problems of VM data center managers.

Today we're still #1 in VM. But we're a whole lot more: An innovator in network administration. A source of SQL/DS and DB2 database tools. A leader with Network Data-Mover products for multiple environments.

Our new name—Systems Center—reflects this expanded capability. It also signals our determination to be a continuing focal point of energy and creativity for our industry.

Through the years to come, we will continue to provide superior products for VM and networked environments. And we will continue to champion the cause of systems professionals everywhere by developing and marketing appropriate, effective technology.

Systems Center. It's a name to count on. A company to grow with. A high-energy resource for an emerging era. For more information write or call today: Systems Center, Inc., 1800 Alexander Bell Drive, Reston, VA 22091, telephone (703) 264-8000.

NEWS SHORTS

Apple bites Apple

A pop icon of the 1960s took on a pop icon of the 1980s last week when the company that represents the Beatles, Apple Corps. Ltd., sued Apple Computer, Inc. for violating a long-secret agreement. Apple Corps., parent company of the Beatles' Apple Records, charged in a London court that it granted Apple Computer permission to use the Apple name in 1981 under a single condition — that the computer vendor not get into the music business. Apple Computer, which maintained last week that it hasn't broken the 1981 promise, may not have moved directly into the music field, but its customers have used Macintosh and Apple II computers to create music.

HP claims edge over AS/400

Hewlett-Packard Co. threw itself last week into the benchmarking wars with the release of test results that HP says beat the IBM Application System/400. The company put its HP 3000 Series 935 up against an AS/400 Model B30 in a variation of the Debit/Credit benchmark and claimed that its system ran four transaction/sec., while the IBM minicomputer limped along at 1.3 transaction/sec. HP said it plans to redo the test once the Transaction Processing Performance Council establishes a standard Debit/Credit benchmark. IBM dismissed HP's results and said that without a standard Debit/Credit test, vendors cannot accurately compare systems.

HP weds academia

In other news, HP said it will tap into worldwide academic research by spending \$15 million during the next three years on three science centers, at which HP and university scientists will work together. The first center will open next month at Stanford University. Research at Stanford will focus on artificial intelligence, database technology and neural networks, HP said. Two other centers will be sited in Europe and along the Pacific Rim during the next two years. Citing a drop in federal funding of university research, HP said the centers will speed commercialization of technology resulting from research.

Packet net targets heavy users

AT&T last week announced Private Packet Network Service, a public packet-switched offering that targets high-volume users with the cost advantages and network management features of a private network. In contrast to AT&T's existing Accunet packet-switched service, which levies use-sensitive charges, the new service carries a flat monthly fee for dedicated trunks, an AT&T spokeswoman said. Users can also control and configure their networks from an on-premises IBM Personal Computer, she added. Scheduled for release in the third quarter, the as-yet unpriced service will also provide a portion of the U.S. General Service Administration's (GSA) Federal Telecommunications System 2000 network.

One FTS-2000 protest rejected

MCI Communications Corp.'s protest of the FTS-2000 contract awarded to AT&T was dismissed last week by the GSA's Board of Contract Appeals [CW, Feb. 13]. The board said MCI had no standing to protest because it was bidding as a subcontractor to Martin Marietta Corp. for the federal intercity network. Still pending is a separate protest that Martin Marietta filed with the GSA contracting office, rather than with the Board of Contract Appeals.

Cadam downsized

Cadam, Inc., a mainframe-based computer-aided design software vendor based in Burbank, Calif., last week introduced a hardware-independent computer-aided design, manufacturing and engineering (CAD/CAM/CAE) application. Professional Cadam will now run on Unix-based workstations from Apollo Computer, Inc., IBM, and Sun Microsystems, Inc. The company has also ported its printed circuit-board design software to Unix. The moves are intended to bring mainframe-class CAD/CAM/CAE abilities to the 32-bit Unix workstation level.

Customs net seals U.S. border

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Walter Curran, a Boston stockbroker who was recently charged with federal mail and bank fraud, escaped to Canada — but was apprehended at a border station on his way back to the U.S. Chalk up another triumph to law, order and the U.S. Customs Consolidated Data Network.

The network, a recently upgraded version of the 19-year-old Customs Law Enforcement system, links border agents to Customs' data center near Washington, D.C., letting them know whether the vehicle approaching their station is likely to contain a harmless tourist, an armed drug runner — or a possible white-collar criminal on the lam. For example, when the border inspector entered Curran's Massachusetts driver's license into his terminal, the system quickly provided information on the broker's arrest warrant, a Customs spokesman said.

Matching the crooks

"The object of the system is to provide [Customs] agents with as much information as possible: The more they get, the better armed they are," said R. Gary Cantrell, director of the operations division of U.S. Customs' Office of Data Systems. "Crooks are getting more modern weapons, so we needed to as well."

The original drug enforcement system began almost two decades ago as a pilot project in San Diego, near the Mexican border. It was "very much a homegrown effort," consisting of line-oriented asynchronous terminals, internally developed software, a Burroughs Corp. mainframe and a database garnered from the records of the lo-

cal Bureau of Motor Vehicles, according to network section leader Charles Dukes. The network now serves the entire U.S. border, including airports. Approximately 3,000 terminals participate in the network.

In September 1987, the Office of Data Systems initiated a

Alcohol, Tobacco and Firearms and some miscellaneous Treasury Department agencies are scheduled to be on the network.

The new system is already said to provide more complete data, faster. Higher bandwidth (formerly 4.8K bit/sec., now up to 56K bit/sec.) has cut response



U.S. Customs' Cantrell uses computers to patrol the borders

six-month project to move the San Diego data center under the wing of central information systems. Customs expects to save approximately \$1.75 million from the consolidation effort, Cantrell said. Savings will result largely from the elimination of redundant technical and support personnel, he added.

At the same time, software and databases were converted to Computer Associates International, Inc. subsidiary Applied Data Research, Inc.'s Datacom/DB software running on a National Semiconductor Corp. NAS XL-80 mainframe. The system has since been upgraded to an XL-100. Communications lines were gradually cut over to the Consolidated Data Network. By year's end, all of Customs; the Internal Revenue Service;

time down to three seconds at airports, Cantrell said. A single query to the new system can result in a 20- to 50-line response that identifies the person or vehicle, what he is suspected of, what business he is in and past convictions, according to Jerry Dowell, Customs data center senior consultant. "The old system was designed to pass succinct messages," Dowell said.

Law enforcement agents will also be able to swap data with other government agencies as they come on-line, Dowell said. For example, a border inspector might find out if an identified suspect is in the Federal Bureau of Investigation's files.

An enhancement is planned that notifies agencies in other countries if a suspect is heading their way, Dowell said.

DEC's water-cooled host still afloat, sources say

BY JAMES DALY
CW STAFF

MAYNARD, Mass. — Reports that Digital Equipment Corp.'s water-cooled mainframe project were shelved may have been premature, and the company may release the machine by the end of the year, according to sources close to the company.

In November, both a report by the TFS, Inc. research firm and a DEC internal memo stated that plans for the water-cooled system, code-named Aquarius, were scrapped because the company felt it could achieve acceptable performance with an air-

cooled, less-powerful model, code-named Aridus, and get it to market faster.

But DEC is reportedly still warm to the idea and is tinkering with two versions of Aquarius, each sporting a different cooling arrangement, sources said. The first is a fluid-to-air system conceptually similar to an automobile radiator; a second fluid-to-fluid model would be plug-compatible with an IBM 3090 thermal-conduction system.

Aquarius will reportedly process 30 million instructions per second (MIPS) and support up to four CPUs. Additional features would include a 1G byte/sec. in-

ternal system bus, 256M to 2G bytes of memory, a 16-nsec clock speed and a choice of vector accelerators or vector CPUs, sources said.

Additionally, the machine will be capable of providing 125 million floating-point operations per second (MFLOPS) peak performance with a vector accelerator or 250 MFLOPS with a vector CPU. Pricing will be between \$1 million and \$4 million, depending on the number of CPUs.

In such a configuration, Aquarius could appeal to commercial users in the banking and finance fields, while the vector facility setup could handle scientific applications. "It could very well be positioned as a 3090 alternative," said Terry Shannon, director of the DEC Advisory Service arm of Framingham, Mass.-based International Data Corp.

SATISFACTION GUARANTEED

If you have been searching for a software company that can provide you with a wide range of software solutions, backed up by first rate support, we invite you to join the over 6,500 MVS, DOS and VM users who have found long term software satisfaction with SEA. Since 1982, we have been developing products based on your input and backing these products with support you can count on 7 days-a-week, 24 hours-a-day. The results have been impressive for both us and our users. With products licensed at one in every four mainframe sites worldwide, SEA software has set new standards for efficiency and performance. Our over 6,500 licensed users include 9 of the Fortune 10, 85% of the Fortune 500 and thousands of other installations of all sizes and configurations. An equally important factor in measuring our success is our high level of user satisfaction, in which we take great pride.

SEA PRODUCT GROUPS

Operations Automation Group

SEA provides a complete line of operations automation products covering all critical areas. We are the only company that provides such a complete line of operations automation software, backed up by first rate technical support. With over 2,500 users choosing SEA as their single source for operations automation software, we have assumed a position of leadership in the field. Many users tell us the reason they have selected our products is superior support, as well as our integrated approach to long term product development.

ODDS - Master Console Management.

SAVRS - Sysout, Syslog and JCL Management, Viewing, Archival and Retrieval.

TRMS - Report Management and Distribution.

CSAR - Automated Job Scheduling MVS-DOS-VM.

TRAMS - Data Transmission Management System.

QUICK TRANS - Data Compression/Decompression for increased data transmission between mainframes or mainframes and PC networks.

SYNTHETIC JOBSTREAM - Functionally verifies operating system and hardware changes before production implementation.

KEYS - A keyword assisted search program for software and hardware inventory management.

DASD /Data Management Group

SEA's DASD/Data management tools have become corporate standards, used in one out of every five MVS data centers worldwide. Our DASD management products provide dramatic savings under virtually any configuration and have set a new standard for efficiency and high performance.

We take very seriously our claim of being able to significantly decrease DASD expenditures in any MVS configuration. Our unique approach enables us to guarantee you significant savings in both short and long-term DASD cost. Take the opportunity to trial our products with no obligation and we will provide you with the same guaranteed results achieved by over 4500 users, regardless of your installation's size or configuration.

PDSFAST - High speed DASD Management, PDS Management, 100% IEBCOPY replacement.

FASTGENR - High speed replacement for IEBGENER.

PDSUPDTE - High speed global JCL/PDS editor.

Application Development Group

SEA's application development products, used at over one thousand locations, have helped increase programmer and program productivity. They aid in application development for CICS, database systems and monitor program performance and operational dependencies.

PRO-2 - Application Development MVS-DOS.

PROFILE - Performance Measurement and Analysis.

VSAM Group

On the average, VSAM consumes over one-third of all DASD and greatly impacts performance at many installations. SEA's VSAM products have helped many users reduce VSAM space requirements by over 25% while greatly increasing VSAM performance.

VCF/L - ListC replacement, VSAM tracking and reporting.

VCF/M - Automated VSAM optimization and allocation.

VCF/D - VSAM data manipulation.

SEA also offers a complete line of products for the DEC/VAX environment including DBMS/4th GL and output queue optimization.

SEA has products that will save budget dollars and increase efficiency, whatever your installation's size or configuration. No other software company even comes close to matching our combination of a comprehensive line of high quality software solutions, backed up by the highest levels of technical support. We invite you to join the thousands of installations who have found long term software satisfaction with SEA products.

For further information regarding any of the above call 1-800-272-7322.

SEA

SOFTWARE ENGINEERING OF AMERICA, INC.

WORLD HEADQUARTERS • 2001 Marcus Avenue, Lake Success, New York 11042

Tel: (516) 328-7000 1-800-272-7322 Telex: 6973556 Fax: (516) 354-4015

Products Licensed In Over 40 Countries

OS/2 for 386 will not be out this year

BY PATRICK WAURZYNIAK
CW STAFF

REDMOND, Wash. — An upgrade of OS/2 with Presentation Manager specifically designed for the Intel Corp. 80386 microprocessor will not ship to end users until sometime in 1990, Microsoft Corp. confirmed last week.

At the company's third annual systems software forum, Microsoft said it plans to ship 386 OS/2 tool kits to its developers later this year, with delivery of an end-user, 386-specific OS/2 version scheduled for an undetermined date next year.

In the meantime, Microsoft demonstrated an early version of its Windows 3.0 operating environment, currently being developed by the personal computer software market leader.

Over the barrier

The demonstration, which was called Windows Version 3.0 Debug Release 1.14, showed the program's ability to load several applications into memory above the 640K-byte DOS memory limit.

The company loaded a large Microsoft Excel spreadsheet, Microsoft Write, Aldus Corp. Pagemaker and a Pagemaker

application and still had 836K bytes of memory free under the new Windows version.

While Windows 3.0 appeared to operate in protected mode, which allows up to 16M bytes of addressable memory, Microsoft Vice-President of Systems Software Steve Ballmer dismissed any potential adverse impact that such a Windows release could have on the firm's OS/2 Presentation Manager versions, which can also run applications above the 640K-byte barrier.

Thomas Galvin, an analyst at Smith Barney, Harris Upham & Co. in New

York, said that Windows 3.0 should have little tangible affect on OS/2's ramp-up. He noted that Windows 3.0 still lacks the multitasking and interprocess communications capabilities of OS/2.

"I see it more as a way to show users what they could do with the 386," Galvin said. Windows 3.0, he added, "gives them some momentum to their whole push for Presentation Manager and for their technology."

Although Ballmer would not be more specific on the company's timetable for delivery of the 386 OS/2 Presentation Manager tool kits and end-user 386 OS/2 products, he and other Microsoft executives nevertheless remained upbeat about the outlook for OS/2 Presentation Manager applications development.

At Leasametric, we stay on top of every Macintosh we rent.

With the most complete array of services anywhere—installation, a toll-free number for on-line diagnostics, short and long-term rentals, and both operating and finance leases. All tailored to your individual needs.

Leasametric lets you choose from one of the largest, most consistent nationwide inventories of Apple® computer products. Rent or lease the Macintosh® SE, with its advanced graphics and large storage capacity for memory-intensive applications like spreadsheets and databases. Or the high-performance Macintosh II, whose great speed and open architecture are ideal for advanced applications in business, science, engineering and desktop publishing.

There's the full family of LaserWriter® II printers as well—the indispensable desktop publishing tools with more type styles, better high-resolution graphics, and full networking capability.

And we have the Apple-compatible equipment you need for a multi-vendor network. Plus the support you need to keep any network in top condition. Comprehensive support—including on-site maintenance and return-to-depot programs—that's helped make us the nation's largest source for rental and leased computer equipment.

So the next time you need Apple products, call the people at the top for service and selection—the professionals at Leasametric.



Authorized
Value Added Reseller

LEASAMETRIC

Data Communications

Northwest: (800) 343-7368, (415) 574-5797 • Southwest: (800) 638-7854, (818) 708-2669 • Central: (800) 323-4823, (312) 595-2700

Northeast: (800) 221-0246, (201) 825-9000 • Southeast: (800) 241-5841, (404) 925-7980

© Leasametric, Inc. 1988. Apple, the Apple logo, Macintosh, and LaserWriter are registered trademarks of Apple Computer, Inc.

FTS-2000

CONTINUED FROM PAGE 1

being awarded, according to James F. Kerrigan, a federal market analyst at Input, Inc. in Vienna, Va., and other sources.

GSA officials said the action is necessary because of legislation enacted last year by the U.S. Congress, which sought to curb defections from FTS-2000 by making it mandatory for federal agencies to use the new intercity network.

"They're just implementing the wishes of Congress . . . but it's a very aggressive implementation," said Eben G. Townes, a procurement analyst at the market research firm IDC Washington, Inc. in Vienna, Va. For example, the GSA turned down five of six network procurements planned by the U.S. Department of Commerce. Reed Phillips, director of information resources management, said that only a network for the 1990 census was given an exemption.

Some federal managers such as Phillips and Martin Wagner, director of telecommunications management at the Department of the Treasury, supported the GSA action as a logical implementation of the law, but others opposed it. One network manager, who requested anonymity, said he is worried that FTS-2000 data services may not be available soon enough to meet user requirements at his agency.

Specifically, GSA's new policy includes the following orders:

- Agencies are required to use FTS-2000 for all voice, data and video services that the FTS-2000 contractors provide, unless the GSA grants an exemption.
- Agency networks must incorporate FTS-2000 services as they become available.
- When existing contracts expire, agencies must convert to FTS-2000 and must not exercise renewal or extension options. Also, exemptions previously approved for the Department of Defense are withdrawn and will be reviewed.
- The GSA will help agencies develop plans for switching to FTS-2000.

The GSA also signaled its aggressive approach by announcing it will monitor 70 to 100 agency computer procurements to help steer them away from bid protests that plague many procurements.

Numerous procurement scandals and pressure from Congress are driving the GSA toward a stronger oversight role, analysts and federal managers observed. "GSA is being perceived as too easy now, so they're going to toughen up a little bit," Kerrigan said.

More power to the people.

ORACLE
5.1B
IS HERE

ORACLE has led a revolution in PC relational database technology. More power. More portability. More con-



nectivity. More reasons than ever to make ORACLE your corporate standard database.

New tools with even more power.

We're proud to announce our newest release—Professional ORACLE Version 5.1B. Now you can run your applications in OS/2 or in protected mode above 640K in MS-DOS. So you have more room for more powerful applications. And those same applications run unmodified on almost all workstations, minicomputers and mainframes.

Version 5.1B delivers a new level of power to your PC developers including the latest versions of:

- **SQL*Forms®** NEW! Enhanced 4th-generation application development environment.
- **SQL*Menu®** NEW! Flexible interface builder for defining complex menu systems.

• **SQL*ReportWriter™** NEW! Non-procedural development and runtime powerhouse for producing any report.

• **SQL*Plus®** Oracle's ANSI-standard SQL query and administration tool.

• **Pro*C™** The C-language pre-compiler and subroutine call interface to ORACLE.

Learn SQL on us.

Learn the language of the revolution. Order Professional ORACLE today for \$1299 and we'll include ORACLE SQL*Tutor, a nine-module PC-based SQL instruction program that sells by itself for \$199.

Try ORACLE for \$199.

Our Trial Version is identical to Professional ORACLE, but can't be used in networked configurations and allows a maximum user database size of 1 MB. It's a powerful tool for prototyping your first ORACLE application. And its price can be applied to the purchase of a full Professional ORACLE license.

ORACLE®

COMPATIBILITY • PORTABILITY • CONNECTABILITY

Call 1-800-ORACLE1, ext. 8131 today.

Money-back guarantee.

If you haven't tried ORACLE yet, now there's even more reason to join the SQL revolution. More tools. More power. If ORACLE 5.1B doesn't revolutionize the way you develop PC database applications, return it within 30 days for a full refund.

Call 1-800-ORACLE1 ext. 8131, or an ORACLE MasterVAR today.

Dear Oracle

Oracle Direct • 20 Davis Dr. • Belmont, CA 94002
1-800-ORACLE1, ext. 8131

Since your 30-day money-back guarantee eliminates any risk on my part, please send me the software below. Enclosed is my ☐ check, or ☐ VISA ☐ MasterCard ☐ AmEx credit card authorization. Offer valid only in the USA. Please send ☐ 5.25" High Density or ☐ 3.5" disks.

☐ Professional ORACLE for MS-DOS with free ORACLE SQL*Tutor for \$1299 \$ _____

☐ Professional ORACLE for MS-DOS Trial Version for \$199 \$ _____

☐ Professional ORACLE for OS/2 for \$1299 \$ _____

Professional ORACLE Requirements: **MS-DOS**—80286/80386 PC with MS-DOS V3.1+, hard disk, 640KB of memory and 896K extended memory required. 2.5MB of extended memory recommended (required for SQL*ReportWriter). **OS/2**—80286/80386 PC w/ OS/2 V1.0, hard disk, 3MB memory. SQL*ReportWriter not available for OS/2 and is replaced by SQL*Report.

☐ Just send ORACLE SQL*Tutor for \$199 \$ _____
Minimum Requirements: 256K PC with hard disk. Color monitor suggested.

Subtotal \$ _____

Please add appropriate sales tax \$ _____

Total enclosed/authorized (USA only) \$ _____

NAME _____ TITLE _____

COMPANY _____

STREET (no P.O. boxes, please) _____

CITY _____ STATE _____ ZIP _____

PHONE _____

CREDIT CARD NO _____ CARD EXPIRATION DATE _____

SIGNATURE _____ TODAY'S DATE _____ **COMPWORLD**

Anatomy of a strategic alliance

Hewlett-Packard and 3Com said the first wave of products from their strategic alliance will be delivered in the second quarter and sold by both companies. The duo outlined the following areas of joint product development, cooperation and marketing:

- Forming the basis of HP 3+Open LAN Manager with 3Com's 3+Open network software, which is based on Microsoft's OS/2 LAN Manager.
- Eventually linking HP's OS/2 offering to its 3000 and 9000 minicomputers.
- Ensuring 3+Open will work with LAN Manager/X, a Unix port of LAN Manager co-developed by Microsoft and HP.
- Co-development of a common TCP/IP for their LAN Manager-based products and a variety of network services and

multivendor connectivity products.

- Network management products operating under HP's Openview architecture.
- CCITT X.400-based electronic mail to enable HP and 3Com E-mail users to exchange messages with each other and other E-mail systems that support X.400.
- Incorporation of features from HP's New Wave user interface product into future releases of 3Com products.

Currently, 3+Open supports MS-DOS, OS/2 and Apple Computer, Inc. systems. HP supports Unix as well as its MPE/XL proprietary system. The idea is to give users in both environments access to applications and systems running under all of these environments.

PATRICIA KEEFE

HP buys

CONTINUED FROM PAGE 1

next two to three quarters," said Frank Dzubeck, a network consultant and president of Network Communications Architects.

In addition to the service, a 3Com spokeswoman said that the vendors' top priority was porting 3Com's 3+Open network software, which is based on Microsoft Corp.'s OS/2 LAN Manager, to Unix. This would enable 3+Open, which will be resold by HP, to talk to HP's Unix port of LAN Manager, LAN Manager/X (LM/X). LM/X will reportedly ship in the fourth quarter.

Under a nonexclusive agreement, HP said it will provide worldwide support for 3Com systems, including its Bridge Communications, Inc.-labeled products. Customers of both vendors can now purchase support services for HP and 3Com equipment under one contract.

"I have much more confidence in HP support," said an HP and 3Com user at a large paper products company in the Northwest who currently has his 3Com networks serviced through an agreement with an independent contractor. He said he is inclined to hand over all his 3Com service needs to HP, praising the ability to maintain one service contract as a positive move.

FOR 3COM TO develop the support infrastructure it needs to compete with DEC and IBM in corporate accounts is an awesome task."

STEVEN SPANIER
INFONETICS

With more MIS directors taking charge of local-area network purchasing [CW, Feb. 20], LAN vendors are moving quickly to rid themselves of a reliance on reseller-provided services. 3Com rival Novell, Inc. also unwrapped arrangements last week with four service providers, including HP.

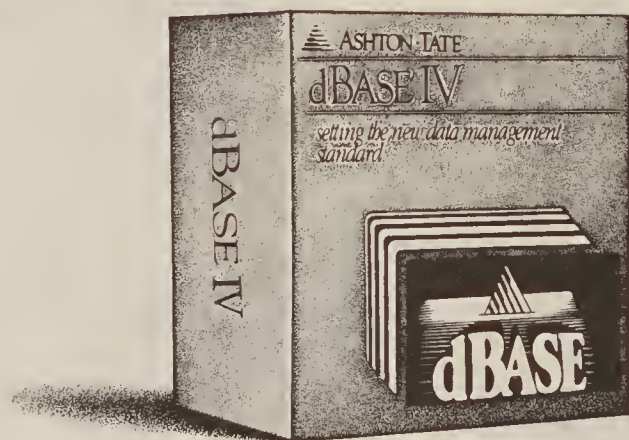
"Service and support will more and more become the differentiating factor. For 3Com to develop the support infrastructure it needs to compete with DEC and IBM in corporate accounts is an awesome task," said Steven Spanier, an analyst at Infonetics, Inc., a market research firm in Santa Clara, Calif. On the other hand, HP's service is rated very highly in the kinds of accounts that 3Com wants to cultivate, he added.

The scalable server concept ties in well with the desire of minicomputer vendors to both fend off the encroachment of high-end workstations and tie their Unix systems into MS-DOS-based LANs.

"I'd really like to see HP minis as servers," said David Mathews, manager of the computer center at the Business School of the University of Southern California at Los Angeles.

3Com Chairman William Krause said the partnership will also result in a broad range of distributed computing products based on industry standards, with a clear emphasis on Transmission Control Protocol/Internet Protocol and CCITT X.400.

Finally, the dBASE you've been waiting IV.



Get the new dBASE IV. Now for just \$449.

Are you waiting for a data base management program that's faster than dBASE III PLUS™? One that's also much easier to use. And one that smartly supports both OS/2 and multi-user environments. Well, wait no longer.

The new dBASE IV™ features all these enhancements and more. Its automatic, built-in compiler executes programs significantly faster than before. And its new Command Center lets you enter data, do queries and generate reports all without having to write programs. You simply interact with menu-driven, "What-You-See-Is-What-You-Get" screens.

Experienced users can continue using familiar "dot prompt" commands. Or, take advantage of dBASE IV's new IBM® SAA-compatible SQL commands.

Of course, dBASE IV runs all your dBASE III PLUS programs. Only better. And most single-user dBASE III PLUS and dBASE IV applications can now run as multi-user applications. Without modification.

Only Software Spectrum offers you dBASE IV at a price you can't pass up. As well as the most reliable, responsive service in the business. So what are you waiting for? Call 1-800-624-0503* for more information or to open a corporate account.

 ASHTON-TATE®

 SOFTWARE
SPECTRUM

10420 Miller Road • Dallas, Texas 75238 • 800-624-0503 or 214-349-0400. *In the Midwest, 800-445-6454 or 312-969-5700.
Ashton-Tate is a registered trademark and dBASE III PLUS and dBASE IV are trademarks of Ashton-Tate Corporation. IBM is a registered trademark of International Business Machines Corporation.

100

100

Announcing ORACLE FINANCIALS

*"Ready for you only after
they work for us."*



Oracle Financials

Oracle General Ledger,TM Oracle Payables,TM Oracle PurchasingTM and Oracle AssetsTM applications have world-class functionality, yet are so easy to use that you may not bother to read documentation. Not only can they do anything you need to do, but they do it effortlessly and on the computer of your choice — mainframe, minicomputer or workstation — at the location of your choice.

"...Oracle Financials seems too good to be true. They offer full-featured accounting capabilities...without having to write any applications."

— Howard Ember, Treasurer, Tootsie Rolls

The best software quality control in the world

"By being the very first production user, Oracle demonstrated their absolute confidence in the financial software they intended to sell. This quality control alone makes Oracle Financials worth a close look."

— David Thomas, Hambrecht & Quist

In three years, Oracle's sales grew from \$25 million to almost \$300 million. They went from 1000 customers to over 10,000, from 2 products to over 100, from \$15 million in total assets to over \$250 million with several major corporate reorganizations along the way. Oracle Financials were there every step of the way.

"Oracle Payables is one of the few packages we evaluated that can really deal with the demands of a very large company. And by being able to implement Oracle Financials on our existing minicomputers, we saved \$500,000 over the cost of other alternatives."

— Michael Prince, Data Processing Manager, Burlington Coat

"The flexibility of Oracle Financials lets us focus on our company's growth, not our accounting systems. Whatever your industry, whatever the size of your company, we are certain that these products will work for you. We invite you to attend the next Oracle Financials briefing and demonstration in your area."

— Jeffrey L. Walker, Senior VP, CFO Oracle Corporation

ORACLE[®]

Call 1-800-345-DBMS, ext. 8110 today.

Copyright © 1989 by Oracle Corp.
Oracle Financials, Oracle General
Ledger, Oracle Payables, Oracle
Purchasing and Oracle Assets are
trademarks of Oracle. TRBA

20 Davis Drive, Belmont, CA 94002 • World Head-
quarters (415) 598-8000 • ORACLE Canada (800)
387-4407 (except Quebec) • Quebec (514) 337-0755 •
ORACLE Systems Australia 61-2-959-5080 •
ORACLE Europe 44-1-948-6911 • ORACLE Systems
Hong Kong 852-5-266846

Oracle Financials Seminars

AZ	Scottsdale	Apr 11
CA	Costa Mesa	Apr 25 Jun 22
	Los Angeles	Mar 14 Apr 20
	Ontario	Mar 21
	Sacramento	Mar 21
	San Diego	Mar 16
	San Francisco	Mar 29
		May 18
	Santa Clara	Mar 9
	Universal City	Apr 6
CO	Englewood	Mar 7 Jun 6
CT	Farmington	Mar 7
	Stamford	Mar 21 Jun 8
FL	Tampa	Mar 22
GA	Savannah	Apr 27
HI	Honolulu	Mar 14
ID	Boise	Apr 13
IL	Chicago	Feb 28
		Mar 21 Apr 18 Jun 14
IN	Indianapolis	Mar 22 Jun 7
KY	Louisville	Apr 4
MA	Boston	Apr 20 Jun 6
	Burlington	Mar 15
MD	Baltimore	Apr 12
	Columbia	Mar 15
ME	Portland	Mar 2
MI	Dearborn	Apr 4
	Grand Rapids	Mar 8 Jun 6
	Troy	Mar 7 Jun 7
MN	Minneapolis	Mar 14 Jun 13
MO	Kansas City	Jun 27
	St. Louis	Mar 9 Jun 6
NE	Omaha	Apr 6
NJ	Iselin	Mar 30 Jun 28
	Princeton	Mar 15
	Secaucus	Mar 2 Apr 19
NM	Albuquerque	Mar 7 Jun 7
NV	Las Vegas	Apr 27
NY	Buffalo	Jun 6
	East Syracuse	Jun 15
	Melville	Mar 15
	New York City	Feb 22
		Apr 19 Jun 14
OH	Beachwood	Apr 5
	Cincinnati	Mar 23
	Columbus	Mar 9
OR	Portland	Mar 14
PA	Philadelphia	Apr 10 Jun 19
	Pittsburgh	Mar 15 Jun 14
SC	Charleston	Mar 9
	Greenville	Apr 13
TN	Memphis	Apr 19
	Nashville	May 4
TX	Dallas	Mar 7
		Apr 4 May 4 Jun 7
	Houston	Mar 9
		Apr 6 May 4 Jun 8
WA	Seattle	Feb 21 May 17
	Spokane	Apr 25
WI	Madison	Feb 22
	Milwaukee	Mar 8 Jun 6

Attn: National Seminar
Coordinator
Oracle Corporation
20 Davis Drive
Belmont, California 94002
1-800-345-DBMS, ext. 8110

☐ My business card or
letterhead is attached.
Please enroll me in the
FREE Oracle Financials
seminar to be held

at: _____

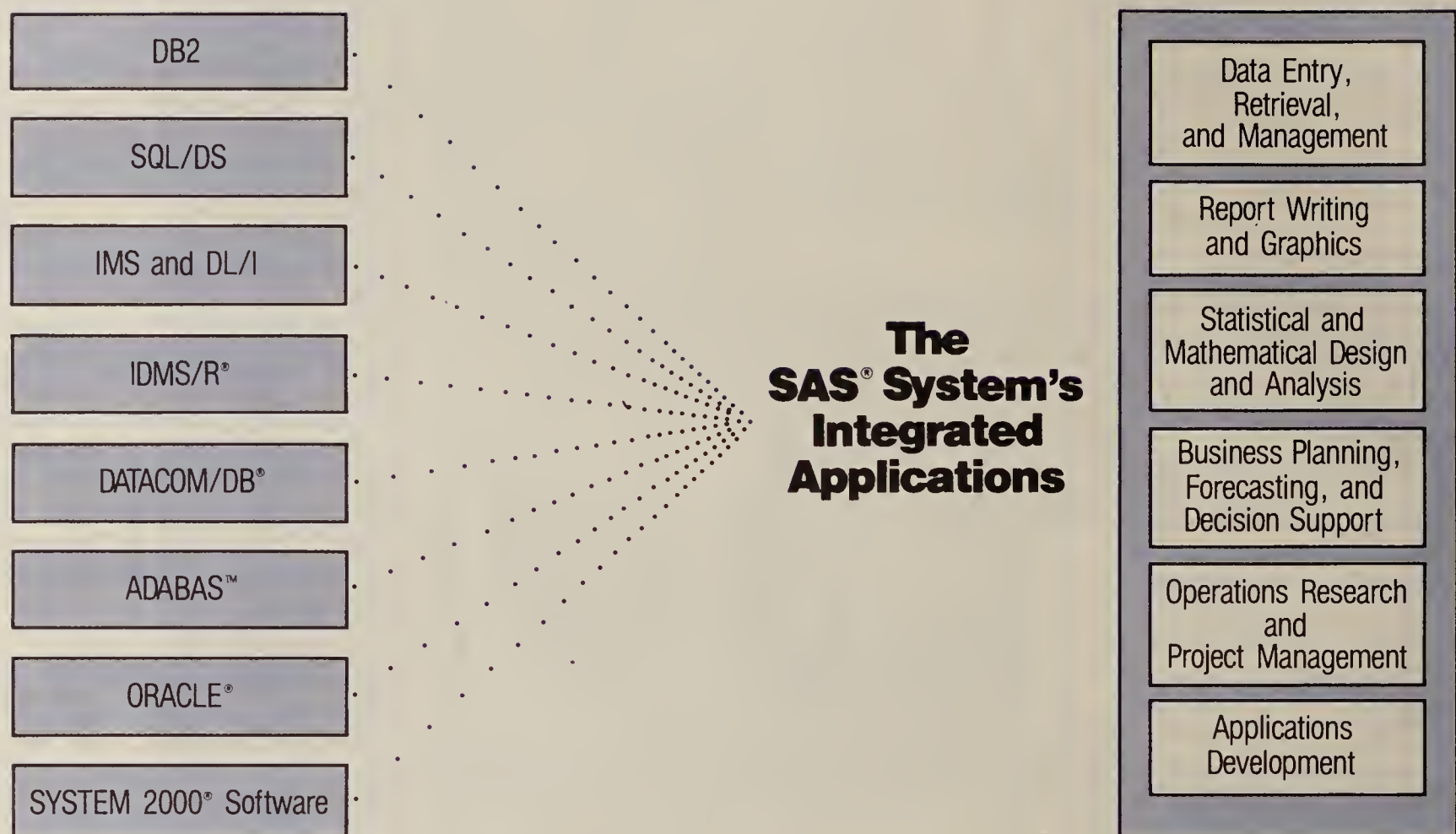
on: _____

COMPUTERWORLD

100

100

Get the Facts from Your DBMS.



The SAS System, the most powerful applications software, has joined forces with the most popular data base management systems. To turn raw data into meaningful facts. To analyze, estimate, optimize, simulate. To produce custom reports and color graphs. And to protect your investment in data base technology.

Ready-to-use SAS software tools uncover the real meaning of all those names and numbers locked in your data base. It's easy to forecast sales and cash flow. Perform statistical analyses. Build financial and planning models. Create spreadsheets of unlimited size. Schedule projects for best use of time and resources. Generate calendars, charts, and many other formatted reports.

You can also develop your own applications using the SAS System's efficient fourth-generation language. Then customize these applications any way you wish.

If You Know Data Bases. And Even if You Don't.

Menu-driven interfaces link the SAS System with such popular data bases as DB2, SQL/DS, IDMS/R,

The SAS® System's Integrated Applications

IMS, DL/I, and DATACOM/DB. End users, even those who know nothing about data bases, have immediate access to the data they need. It's as easy as filling in the blanks!

Extract data from your DBMS for use in SAS System applications. Load data from the SAS System directly into your DBMS. Or update values in a data base directly from a SAS System application. All without risk to data security.

Get the Facts Today. And Get 30 Days FREE.

Bring the SAS System together with your data base. You'll receive high-quality software, training, documentation, and support—all from SAS Institute Inc. And we'll start you off with a free software trial.

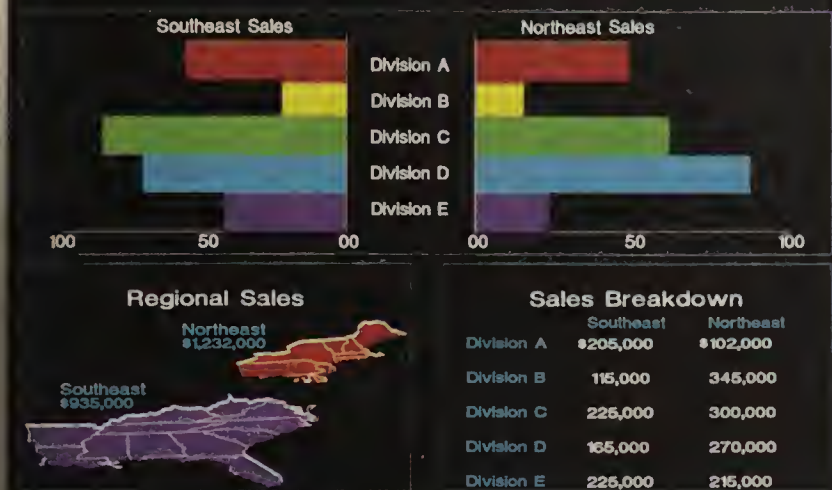
For details, give us a call at (919) 467-8000. In Canada, call (416) 443-9811.



SAS Institute Inc.
Software Sales Department
SAS Circle ☐ Box 8000
Cary, NC 27512-8000
Phone (919) 467-8000 ☐ Fax (919) 469-3737

Get the SAS[®] System.

Ridge Medical Supplies Inc.



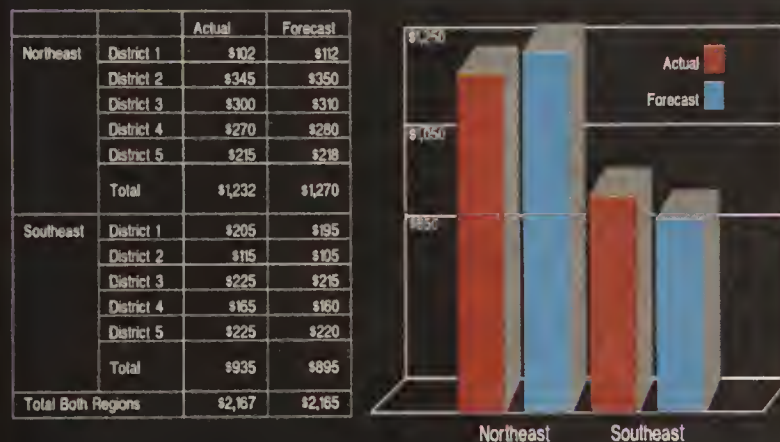
Morgan Cosmetics Inc. P Chart for Perfume Bottle Capacity



EMS Software International Countries with Products Installed



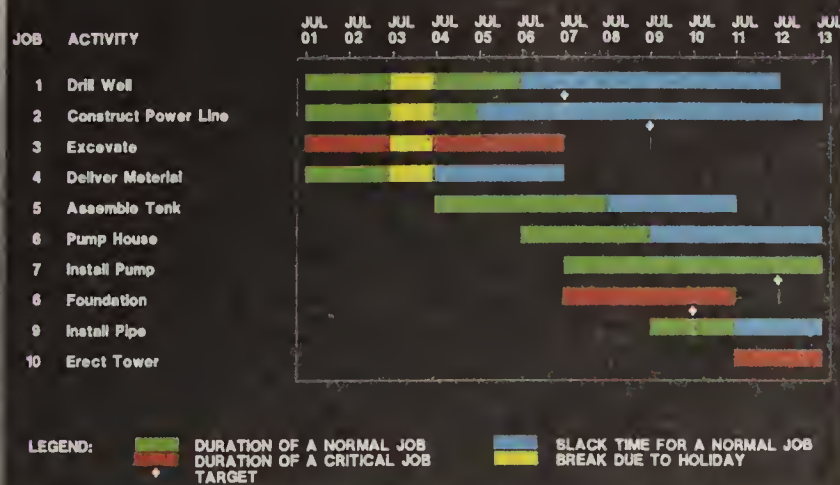
Quarterly Sales



CPU Utilization by Hour



Schedule for Well No. 121-005



The SAS System runs on IBM and compatible mainframes; on Digital Equipment Corp., Prime Computer, Inc., and Data General Corp. minicomputers, on Sun Microsystems, Inc. and Hewlett-Packard workstations; and on IBM PCs and compatibles.

SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA. DB2, SQL/DS, IMS, and DL/I are products of IBM Corporation. IDMS/R is a registered trademark of Cullinet Software, Inc. DATACOM/DB is a registered trademark of Computer Associates. ADABAS is a trademark of Software AG. ORACLE is a registered trademark of ORACLE Corporation.

Copyright © 1989 by SAS Institute Inc. Printed in the USA.

ISDN-hungry

CONTINUED FROM PAGE 1

One such user is Tenneco, Inc., which cut over to Southwestern Bell's ISDN Centrex service last summer. The Houston-based holding company's telecommunications department found that virtually all of the RS-232-based communications packages it tested ran unmodified over its ISDN links, according to Thomas Simmons, manager of worldwide telecommunications at one Tenneco division.

For example, Tenneco now uses Netline, Inc.'s Manylink as a window-driven, menu-based front end that makes it easier for nontechnical PC users to access IBM's Professional Office System. But Manylink

supports only 19.2K bit/sec. — 30% of a 64K bit/sec. ISDN B channel. While Tenneco users "get along OK" with that speed right now, Simmons said his company will definitely want 64K-byte speeds for more advanced applications that are now being considered such as local-area network bridges and image transmission.

Individual interfaces

Netline is one of several software vendors working on 64K bit/sec. versions of their packages. Unfortunately, the lack of a software interface standard requires supplying the package with a different interface for each vendor's ISDN board or phone set, said Netline Executive Vice President Byron Smith.

The same problem applies to a slowly

emerging breed of software packages designed specifically to take advantage of ISDN's voice/data integration.

Hilgraeve, Inc.'s Hyperaccess, for example, has an autoanswer capability that allows users at the University of West Virginia to dial up their PCs and transfer files from home, according to Jeffrey Fritz, a data communications analyst at the university.

Hyperaccess supports speeds of up to 38.4K bit/sec. over the B channel, "which is important for multitasking applications on OS/2 or Apple's Multifinder," Fritz said. The software supports both Telrad Telecommunication, Inc.'s and AT&T's ISDN telephone sets.

However, users with one type of set cannot talk to users of the other because

vendors use different rate-adaption schemes, Fritz said.

ISDN workstations are another area to feel the standards blight. The majority of communications hardware companies currently support IBM Personal Computers, but powerful, multitasking systems such as OS/2 workstations or the Apple Computer, Inc. Macintosh are "ultimately required to do the sophisticated stuff like screen sharing, keyboard control over an ISDN line and doing transmissions and spreadsheets simultaneously," said John Saccente, formerly Tenneco's director of telecommunications.

Specific boards needed

Although workstations can hook up to an ISDN phone set via their RS-232 ports, they need ISDN boards designed specifically for their operating systems to really take advantage of the technology, vendor sources said. Right now, most available boards support IBM PCs. Teleos Communications, Inc. is working on an ISDN board for Unix systems, Northern Telecom, Inc. reportedly has demonstrated a Macintosh board and Apple itself recently hired an ISDN product manager, so the situation is bound to change for the better.

A related problem is that private branch exchange (PBX) vendors have yet to support ISDN's Basic Rate Interface, which would provide third parties with access to their switches' functions via ISDN. While AT&T has officially announced Basic Rate Interface support, it is still pushing its proprietary "ISDN-like" Digital Communications Protocol (DCP), according to one third-party vendor.

AT&T subsidiary American Transtech has found DCP quite adequate for linking user workstations to AT&T's ISDN Primary Rate Interface service, according to Transtech telecommunications manager Todd Stevenson. However, that is because the Jacksonville, Fla.-based financial computer service has stuck with all-AT&T terminals, he added.

More bothersome to Transtech is the current lack of ISDN standards for linking host software to PBXs. AT&T has already provided Transtech with the software to link its 3B computers and System 85 PBXs so that telemarketing agents automatically get a customer's profile on their screens when the customer calls. But Transtech programmers would have to write their own interfaces to provide the same application on the company's other computers, Stevenson said.

AT&T has promised Transtech that it will soon deliver a standardized link between its PBXs and a variety of computers, Stevenson said. Still in question, however, is whether other PBX vendors will support that standard.

Northern Telecom, Inc. has also promised an ISDN-based interface between its PBXs and a variety of hosts, according to Richard Clements, telecommunications manager at Nice Corp. in Provo, Utah.

Nice, like Transtech, has avoided certain incompatibility problems by sticking with one vendor — in this case, Northern Telecom, Clements said.

"But at conferences, a lot of users are saying standards bodies are too slow, and vendors are meanwhile doing their own thing," he added. In particular, the lack of standard messaging formats means that different vendors' PBXs cannot exchange information, even though both are technically ISDN-compatible, Clements said.

Who's getting into your VTAM Network tonight?



Let your security package (ACF2, RACF, TopSecret, VMSECURE, etc.) check on who can get into your VTAM Network *before* they try to access an application.

Available for MVS, VM/GCS, and VSE, THE NETWORK DIRECTOR can require a User ID and Password before allowing the terminal user to attempt to connect to VTAM applications like CICS, TSO, CMS, etc.

Once the user has entered a User ID and Password, THE NETWORK DIRECTOR can validate this information against the security package through supported interfaces (not exits). Once validated, THE NETWORK DIRECTOR can present the user a dynamically created menu of only those VTAM applications that the user is allowed to access.

When the user selects an application from the menu, THE NETWORK DIRECTOR can automate the signon to the application (see list of applications below) so that the user need not repetitively identify himself when switching between applications.

With THE NETWORK DIRECTOR, it is easy to create a "single-point logon" and a "single system image" concept for your VTAM Network and yet also enhance the security of your network.

And THE NETWORK DIRECTOR provides this

concept without the inherent overhead of multiple concurrent session software in the host or session establishment dialogs.

Of course, there's a lot more too:

- Accounting and auditing of network activity,
- Bulletin board and help panels,
- Dynamic application status display,
- Automated signon interfaces to: CICS, IMS/DC, IDMS/DC, TSO, CMS, ROSCOE, Model 204, Com-plete, NCCF, & NetView,
- User validation interfaces to: ACF2 (MVS & VM), RACF (MVS & VM), TopSecret (MVS), VMSECURE (VM), the VM Directory (VM), & THE NETWORK DIRECTOR definitions (MVS, VM, VSE),
- Dynamic online maintenance,
- Broadcast and message facility,
- IntelliCARD smart card identification support.

For more information, or a free trial of THE NETWORK DIRECTOR, please contact North Ridge Software by phone (206) 882-2600 or by FAX (206) 881-6904. Or mail the coupon below.

(Please fill in or attach business card)			
☐ I'm interested in a trial of THE NETWORK DIRECTOR	Name _____	Title _____	Address _____
☐ Please have one of your specialists give me a call	Organization _____	City/State/Zip _____	
☐ Please send me more information	CPU(s) _____	Operating System(s) _____	Area Code/Phone/Extension _____
North Ridge Software, Inc. • 14450 NE 29th Place, Suite 111 • Bellevue, WA 98007-7699, USA  CW2/27/89			

The following are proprietary products and/or trademarks of the following companies: IBM — MVS, VM/GCS, VSE, VTAM, CICS, TSO, CMS, RACF, IMS/DC, NCCF, NetView; CA — ACF2, TopSecret, ROSCOE; Cullinet — IDMS/DC; VM Software — VMSECURE; Software AG — Com-plete; IntelliCARD International — IntelliCARD.

Local representatives in: Belgium, Denmark, France, Iceland, Israel, Luxembourg, Monaco, Netherlands, Northern Ireland, Norway, Sweden, Switzerland, South Africa, United Kingdom.

Vying for attention on the plant floor

IBM WATCH

TONY FRISCIA



Although IBM is No. 1 in providing key manufacturing technologies such as production control and computer-aided design and manufacturing (CAD/CAM), it lags behind competitors DEC and Hewlett-Packard as the vendor of choice for the primary plant computing platform.

Unaccustomed to finding itself in the runner-up position, IBM is using its full resources to capture users' attention on the plant floor. The firm recently introduced the plant-floor series Distributed Automation Edition (DAE), which offers a scalable product line that allows users to run tasks cooperatively on a number of different nodes. Within this framework, IBM is positioning the 9370 as a small plant host or area computer. Support for cells and plant devices is through the personal computer family — the core of the IBM plant-floor strategy.

Along with the introduction of DAE, IBM is making a number of moves to intensify its push to improve its market standing. Two themes are emerging from this thrust: IBM is leveraging its own investment in factory automation to yield internal and external product-development benefits, and the company is getting the message out about the payoffs of computer-integrated manufacturing (CIM) through marketing programs and donating equipment to universities.

These activities contribute significantly to the development and acceptance of DAE. The DAE strategy stems from IBM's internal investment in manufacturing automation. Unlike most manufacturers, IBM can devote extensive resources to turning internally developed manufacturing technology into a commercial business. To support this opportunity, however, the company needs to establish credibility as a plant-floor vendor. The university program and customer education programs are longer term strategies to seed market acceptance.

Learning CIM lessons

Without the experience of automating itself, IBM could not have realized the features that a CIM platform requires. In the past few years, much has been written about the unrealized promise of CIM. Studies show that the problem with making an investment in factory automation is that each plant or process is unique and therefore requires a custom solution.

Until recently, vendors have not offered users the tools to minimize the custom content of major CIM projects. This problem limits the prospects for rapid CIM market development. A user who wants to fully automate is forced to either go into the computer business or to take on the massive job of building piece-meal solutions on multiple platforms. Neither alternative is acceptable.

IBM is well placed to take on the expense of building such platforms because the costs of developing these tools for in-

ternal use can be offset by "productizing" for users. In addition, such facilities are usually turned into marketing showcases.

A question still arises: IBM has little traditional standing on the plant floor — in fact, it is negatively regarded by the plant-floor user culture, which is more accustomed to other vendors and noncomputer control. How does it overcome this obstacle?

Proactive approach

Answering the challenge, IBM quietly rolled out CIM and plant-floor products to its direct sales force, users and third-par-

ty distributors. The company set up a CIM National Support Center in Boca Raton, Fla., for training and support. It installed 14 regional hands-on demonstration centers and 44 minibriefing centers. IBM provided an extensive road show that attracted more than 1,700 users and sales representatives in 17 cities.

This marketing effort included a special "CIM in Universities" campaign. To date, IBM is working with almost 50 colleges and technical schools as part of its Academic Computing Information Systems (ACIS) program. This CIM program will cost IBM approximately \$25 million,

not including promised technical and consulting support.

This ACIS program is especially important in seeding IBM's future in the plant-floor market. IBM established a similar program in the engineering market several years ago at the height of its aggressive move into CAD/CAM, and IBM has since firmed its position as the market leader in that field.

This university program is strategically linked to IBM's future growth in the factory. It is also a confirmation that IBM's commitment to this business is long term, since the investment will take several years to pay off. If the program works, however, the company could go from pariah to preferred vendor in the plant-floor computing market.

"Computerworld Response Card Decks really opened doors to the 'heavy-hitter' accounts..."

Spectrum Concepts, Inc. is a 10-year-old software developer based in New York City. The company, which provides software and services to large corporations and financial institutions, recently developed XCOM 6.2, an LU 6.2-based software product that dramatically improves file transfer between different computing environments.

XCOM 6.2 eliminates the need for extensive custom programming when transferring data from one computer to another, including PCs, mainframes and minis. And it significantly lessens the amount of time necessary to complete connectivity projects.

Company president Alec Gindis was impressed with industry reaction after a news story announcing XCOM 6.2 appeared in *Computerworld*. So when Spectrum began implementing its marketing strategy for the new product, he considered *Computerworld* a key resource.

"Our goal was to generate sales leads from major organizations — Fortune 500 and Fortune 1000-type companies — that need to transfer files. We decided to use response card decks, and, based on the reaction we got to that product announcement, Computerworld's was the card deck we thought of first."

"And it's paid off; the results have been terrific. We've received hundreds of high-quality leads so far, and they're still coming in. In fact, Computerworld Response Card Decks really opened doors to the 'heavy-hitter' accounts — major organizations that learned about us through the cards."

"Now we've gotten to where we are recruiting additional account executives to follow up on the volume of these leads. Computerworld Response Card Decks give us the best cost per lead of any medium. They also let us refine our marketing strategies through scientific 'split testing' — something other card decks don't always offer. We consider that a valuable bonus."

Computerworld Response Card Decks give you a cost-effective way to reach a powerful buying audience of over 127,000 computer professionals. They're working for Spectrum Concepts, Inc. — and they can work for you. Call Norma Tamburrino, Account Manager, *Computerworld* Response Card Decks, at (201) 967-1350 to reserve your space today.



— Alec Gindis
President
Spectrum Concepts, Inc.

COMPUTERWORLD RESPONSE CARD DECKS

Computerworld is an IDG Communications Newspaper

Friscia is president of Advanced Manufacturing Research, Inc., a Salem, Mass.-based research and consulting firm.

U.S. Companies Involved In ISDN Trials And Service Rollouts

Company	Switch	Access	Carrier	Status	Note
Aetna, Hartford, Conn.	AT&T 5ESS	Basic	Southern New England Telephone	Installation underway	
Alverno College, Milwaukee	Siemens EWSD	Basic	Wisconsin Bell	Started March 1988, ends 1989	Trial.
American Express, Phoenix, Ariz.	AT&T System 85 PBX/4ESS	Primary	AT&T	Started July 1988	First customer of AT&T's Primary Rate.
American Transtech, Jacksonville, Fla.	AT&T System 85 PBX/4ESS	Primary	AT&T	Started Dec. 1987	Beta test site for AT&T's Primary Rate.
Arizona, State of, Phoenix	Northern Telecom DMS-100	Basic	US West Communications	Started Nov. 1986, officially ended	
Boeing Co., Seattle	AT&T 5ESS	Basic	US West Communications	Scheduled start Nov. 1988	
Carnegie Mellon University, Pittsburgh	AT&T 5ESS	Basic		Contract pending	
Chevron Corp., San Francisco	Northern Telecom SL-100/ DMS-100	Primary/Basic	Pacific Bell	Installation underway	
Contel Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer.
Control Data Corp., Minneapolis	NEC NEAX 61E	Basic	US West Communications	Started Nov. 1987, ends Nov. 1988	Trial.
Duke University, Durham, N.C.	AT&T 5ESS	Basic	Southern Bell		
Eastman Kodak Co., Rochester, N.Y.	Northern Telecom SL-100 PBXs	Primary		Started Aug. 1988	First Primary Rate using two SL-100s.
Federal National Mortgage Assoc., Washington	AT&T 5ESS	Basic	C&P Telephone	Started June 1988	
First Data Resources Inc. (American Express subsidiary), Omaha, Neb.	Northern Telecom SL-1 PBX and AT&T 4ESS	Primary	AT&T	Unannounced	
Glaxo Inc., Research Triangle Park, N.C.	SL-1 PBX and DMS-100	Primary/Basic	GTE South	Started June 1988	First Primary Rate/Basic Rate in one trial.
Hardees, Rocky Mount, N.C.	Northern Telecom DMS-100	Basic	Carolina Telephone	Scheduled start Jan. 1989	
Hayes Microcomputer Products Inc., Norcross, Ga.	AT&T 5ESS AT&T 5ESS	Basic Basic	Southern Bell Pacific Bell	Started April 1988 Sept. 1987 to Sept. 1988	Using ISDN to develop ISDN products.
Hershey Foods Corp., Hershey, Pa.	AT&T 5ESS	Basic	Contel of Pennsylvania	Scheduled start Oct. 1988	Will include ISDN satellite transmission.
Honeywell Information Systems (Honeywell Bull), Minneapolis	Northern Telecom DMS-100	Basic	US West Communications	Started Jan. 87, officially ended	Applications included data/voice transmission between office and employees at home.
Intel Corp., Chandler, Ariz.	AT&T 5ESS	Basic	US West Communications	Started Feb. 1987, ended Aug. 1987	Trial.
Johns Hopkins Medical Center, Baltimore	AT&T 5ESS	Basic	C&P of Maryland	Contract pending	
Lawrence Livermore Laboratory (University of California), Livermore, Calif.	AT&T 5ESS	Basic	AT&T Federal Systems		
Lockheed Missiles and Space Co. Inc., Sunnyvale, Calif.	AT&T 5ESS	Basic	Pacific Bell	Started Sept. 1987, ended Sept. 1988	Trial.
Mass. Institute of Tech., Cambridge	AT&T 5ESS	Basic		Scheduled cutover Oct. 1988	Using AT&T 5ESS as PBX for private network.
Mather Air Force Base, Sacramento, Ca.	AT&T 5ESS	Basic	AT&T Federal Systems	Started Aug. 1988	Model for ISDN deployment at 50 bases.
McDonald's Corp., Oakbrook, Ill.	AT&T 5ESS	Basic	Illinois Bell	Started Dec. 1986	
McDonnell Douglas Corp., St. Louis		Primary	AT&T	Unannounced	
Microcom Inc., Norwood, Mass.		Basic	New England Telephone	Installation underway	Part of centrex contract.
Motorola Inc., Schaumburg, Ill.	Northern Telecom DMS-100	Basic	Illinois Bell	Planning stage	
NASA, Washington	AT&T 5ESS	Basic	AT&T Federal Systems		
Nice Corp., Ogden, Utah	Northern Telecom SL-1s	Primary			Telemarketing company using private ISDN.
North Carolina State Univ., Raleigh	Northern Telecom DMS-100	Basic	Southern Bell		
Northeast Utilities, Hartford, Ct.	Northern Telecom SL-1s	Primary			PBXs in Rocky Hill Ct. and Meriden, Ct.
Pennsylvania, State of, Harrisburg	Northern Telecom DMS-100	Basic	Bell of Pennsylvania	Contract pending	Statewide network with ISDN in Harrisburg.
Pratt & Whitney, East Hartford, Conn.	AT&T 5ESS	Basic	SNET		
Prime Computer Inc., Natick, Mass.	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer.
Rockwell Communication Systems, Richardson, Texas	AT&T 5ESS with two remotes.	Basic	Southwestern Bell	Scheduled start Dec. 1988	40 buildings in a campus environment will be linked via ISDN.
Shearson Lehman Hutton Inc., New York	AT&T 5ESS	Basic	New York Telephone	Started June 1988	Part of 8,000 line centrex contract.
Shell Oil Co., Houston	AT&T 5ESS	Basic	Southwestern Bell	Start Sept. 1988	Plan to use 5,000 ISDN lines.
Southern Methodist University, Dallas	Siemens EWSD	Basic	Southwestern Bell	Started Feb. 1988	
SunTrust Service Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer.
3M Corp., St. Paul, Minn.	AT&T 5ESS	Basic	Southwestern Bell	Started Aug. 1988	Plan to use 3,165 ISDN lines.
Tenneco Inc., Houston	AT&T 5ESS	Basic	Southwestern Bell	Started June 1988	Plan to use 3,900 ISDN lines.
Texas A&M University, College Station	GTE GTD-5 EAX	Basic	GTE Southwest		
University of Arizona, Tucson	AT&T 5ESS	Basic	US West Information Systems Inc.	Planning stage	Using AT&T 5ESS as PBX in private network.
University of Connecticut, Storrs	AT&T 5ESS	Basic	SNET		
University of Indiana, Bloomington	Northern Telecom DMS-100	Basic	Indiana Bell		
University of Maryland, College Park				Unannounced	
University of South Florida, Tampa	AT&T 5ESS		GTE South	Started Oct. 1987	
U.S. Dept. of Treasury, Wash.				Contract pending	
U.S. Bank of Oregon, Portland	Northern Telecom DMS-100	Basic	US West Communications	Started March 1987	Trial.
Virginia, State of, Richmond	AT&T 5ESS	Basic	C&P of Virginia	Started April 1988	
West Virginia University, Morgantown	AT&T 5ESS	Basic	C&P of West Virginia	Scheduled start Dec. 1988	Plan to use 660 ISDN lines.

Note: This chart was compiled by *CommunicationsWeek* with information provided by Teleos Communications Inc., Eatontown, N.J., as well as from news releases and published reports. Carriers, switch manufacturers and their affiliated laboratories are not listed.

The ISDN Scorecard.

As the demand for ISDN grows, so does the number of ISDN suppliers eager to take credit.

But, as you can see by this CommunicationsWeek chart, there is one clear-cut ISDN leader—the company that helped build the standards for ISDN. That company is AT&T.

95% of ISDN lines are on an AT&T 5ESS® switch.

AT&T Network Systems has helped more local telephone companies install more ISDN lines than any other telecommunications supplier—95% of non-trial ISDN lines. What's more, we've already shipped over 200,000 ISDN lines for future use. Today, 99 central offices can offer operational ISDN services over the AT&T 5ESS switch, with a total of 415 upgraded with ISDN software.

So, while other suppliers are still in product development trials, AT&T Network Systems is helping phone companies across the nation offer ISDN services right now on today's network. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail all over a single phone line.

ISDN is just the beginning.

We believe that ISDN is the beginning of a bigger future. A future we call Universal Information Services. A future where networks can carry voice, data and image into anyone's office or home at any time in any combination, with maximum convenience and economy.

At AT&T Network Systems, this belief is already driving our technology, our product development and our commitment to you.



AT&T

The right choice.

EDITORIAL

The real target

THE NEWS THAT an 18-year-old Chicago hacker will spend nine months in prison without the possibility of parole [CW, Feb. 23] is encouraging to those who advocate a hard line against computer crime. But the conviction and sentencing of Herbert Zinn Jr. under the Computer Fraud and Abuse Act of 1986 also raises a disturbing set of questions about who will be prosecuted under that and other statutes.

On the one hand, it appears that Zinn got what he deserved for purloining more than \$1 million worth of software, destroying files and publishing information on how to crack AT&T's computer security system. His sentence should put a damper on the type of computer bulletin-board chatter that advocates this kind of flagrant disregard for property and privacy. It also sends a message to would-be hackers that breaking into corporate computers is as bad as breaking into corporate offices — and will be dealt with just as sternly.

But the conviction of the "Shadow Hawk" raises new questions about whom the hacker laws protect and whom they convict. Hackers like Zinn are a relatively easy target. They are usually kids operating out of their homes who have little understanding of the organizations they are penetrating. They prowl around until they hit on something juicy, then alter a file or leave a message. Their agenda is to hack for the sake of hacking; any havoc they wreak along the way is incidental.

The more devious and far more dangerous computer criminal is the corporate insider. This hacker usually knows just what he wants to do and how to do it. He works quietly and quickly, deleting or altering batches of files and covering his tracks as he retreats. He is devastating and elusive.

Corporations have an annoyingly schizophrenic attitude toward these two breeds of intruders. They willingly make an example of the amateur hacker but cover up the damage wrought by the pro. Fearful of negative publicity, embarrassed by their own vulnerability, they fire the guilty employee and swallow losses that may run into the millions rather than expose their weaknesses in court.

This brings up an interesting question. Who will be the target of new antihacker legislation? Using it to prosecute loners like Zinn or alleged Internet hacker Robert Morris Jr. may scare off the small-time crooks, but the big offenders will still get away with a kick out the door. This situation will continue until a major bank or insurance company is ready to step out of the shadows, lay bare its mistakes and throw the book at one of its own.

We have long supported legislation to treat computer crime the same as any other crime against property or privacy. Federal and state authorities and the courts are now showing a willingness to do their part to prosecute and sentence violators. We hope the victims won't remain silent.

©1988 RICH FENNANT
COMPUTERWORLD

LETTERS TO THE EDITOR

Clear as Bell

Regarding the article on Bell Atlantic's Lanserver Plus local-area network server [CW, Nov. 7], David Terrie, president of Newport Consulting, appears to misunderstand our product.

Lanserver Plus software integrates Bell Atlantic's Langate central office-based LANs with higher speed, premises-based Ethernet LANs and, early next year, with Token-Ring LANs.

Also, Bell Atlantic provides customers with a full range of services, including financing, leasing, installation, maintenance and custom-solution design.

Terrie's comments regarding PC servers and software fail to recognize that they are targeted at very different markets than the Bell Atlantic product. Our product was designed especially for Langate networks, connecting users who may be miles apart; Novell, Inc.'s Netware and 3Com Corp.'s product cannot run on Langate.

Finally, Lanserver Plus support for Token-Ring LANs will not be available until Release 2, which will integrate the preexisting Langate and Lanserver Plus network management features.

W. Davis Douglas III
Assistant Vice-President
Product Line Management
Business Services
Bell Atlantic
Arlington, Va.

Too big fermi

While Charles Lecht's article [CW, Jan. 16] is in part out of this world, he should spend more time reviewing earthly dimensions: His definition of a fermi is

1,000 times too big. It is actually one quadrillionth of a meter.

Anthony Whitman
Chief Engineer
System Development Corp.
of Japan
Tokyo

Real forces

Your editorial, "Going down" [CW, Jan. 23], prompts legitimate concern for the pricing strategies and profit motives of PC vendors. However, I take issue with your accusation that vendors cloak their actions in the "guise" of market forces when, in fact, there are legitimate

forces to contend with.

With inventory levels for computer hardware at an all-time high, vendors are basically selling equipment that was manufactured when dynamic random-access memory (DRAM) prices were at their highest.

Also, it takes 30 to 45 days to assemble components, manufacture a product and then package it. So, even in a best-case scenario, it might take a vendor about two months to bring a project to market that reflects the lower priced DRAMs.

Nonetheless, if you really want to strike a blow at greed, why not blow the whistle on the DRAM vendors? Both American and Japanese firms played a key role in bringing about a poorly conceived trade agreement that did not fully take into account the dynamics of the marketplace.

Indeed, the trade agreement let DRAM vendors take advantage of market conditions to raise prices and reap exorbitant profits at the expense of consumers and system integrators.

As a board and subsystem manufacturer whose lifeline is very much dependent upon the availability and pricing of DRAMs, I urge the Bush administration to overhaul the trade agreement so that, in the spirit of competition, consumers get a fair shake.

Cliff Wildes
President
Microtech International
Branford, Conn.

This week in history

Feb. 26, 1979

Two employees of Electronic Data Systems Corp. (EDS) held hostage by the Iranian government are freed in a commando-style raid organized and financed by EDS Chairman H. Ross Perot and led by U.S. Army Green Beret Col. Arthur (Bull) Simons.

Iran had seized the EDS employees to force the firm to return to the Middle East.

Feb. 27, 1984

IBM replaces its 3080 series of mainframes with the 3083, 3081 and 3084 models, whose design and circuit-packaging changes reportedly boost internal performance 5% to 14% over current models. Current 3080 series users cannot field-upgrade to the new machines, however.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Why not make it right the first time around?

EFREM G. MALLACH



Funny how people get more credit for fixing a problem than for avoiding it in the first place. Any fool can drive a car to miss a telephone pole. Making a car drivable again after it hits that pole at 40 miles per hour takes talent.

We react the same way in the computer business, and vendors know this. It is amazing how often they create a problem and then fix it with fanfare rather than avoiding it in the first place. It is even more amazing how we thank them for this service rather than asking why the problems arose in the first place.

Here are a few examples of vendors featuring the fix:

Datapoint. Many years ago, this company offered only small, slow, eight-bit processors. All of its competitors had bigger and faster 16-bit minis.

Datapoint's engineers apparently were not very good at designing fast CPUs. So they put several small systems on a wire and invented Arcnet, the world's first local-area network.

The marketing folks pushed modular expansion, file servers and other 1989 hot products — back in the mid-70s. They did quite nicely with the concept for a while. Their salespeople never talked about why Datapoint chose this approach. And customers never questioned it.

DEC. Every article on artificial intelligence mentions Xcon, one of the first successful industrial systems. In the days of the VAX 11/780, there were reportedly only five or six engineers within DEC who could consistently get VAX configurations right. So Xcon was developed to check VAX configurations for validity.

The question nobody asked was, why could every other mini-computer vendor design systems of the same performance level and configuration flexibility in such a way that the ordinary mortals on their staffs could configure them?

IBM. Systems Application Architecture (SAA) is intended to provide common interfaces to several inherently incompatible systems. IBM is fixing a problem and should get credit for doing so.

But let us not forget that the problem is one of IBM's own making. It resulted from IBM management's never having

forced products of different families to work alike. While SAA's benefits — should they ever arrive — will improve the existing state of affairs, it would have been better for users if IBM had managed its product lines to provide user-level compatibility among disparate architectures earlier, and with no noise.

The word "architecture," by the way, should be a red flag. Hearing it usually means that one is about to endure a massive dose of "If you can't fix it, feature it." Lengthy presentations of grandiose architectural schemes are a standard cover-up for lack of real products.

IBM. (It's big enough to get two mentions.) System/36 users who upgraded to the B10 or B20 models of the Application System/400 with the minimum 4M bytes of memory found themselves with far less performance than they had before. IBM did the right things: It offered these users another 4M bytes free for a year and set up support mechanisms to speed their conversion to the lower overhead native AS/400 mode.

Yet amid the praise being heaped on IBM for taking these steps, we tend to forget one thing: The praise is for dealing with a situation that proper testing would have caught and that IBM never should have permitted in the first place.

Problems are not going to go away. Computer systems and their applications grow more complex daily. Perfection, an admirable goal, is not always attainable. The way in which a firm rises to the challenge of dealing with its self-inflicted wounds is a good test of that firm's character.

However, when a vendor touts a problem-solving product or service as a boon to its customers, those users owe it to their management and stockholders to ask the following hard questions:

- Precisely what, dear vendor, is the problem you are solving?
- Was this problem of my doing — or one that you created yourself?
- Should this problem exist in the first place? Do your competitors have it? If not, why not?
- Why couldn't you avoid the problem? What steps have you taken to keep the same thing from happening again?
- If it does happen again, how do I know you'll be just as eager to fix it next time? And will you put that in writing?

It is up to users to keep vendors on their toes. To do this job properly, users must examine the emperor carefully — and scream loudly if he's naked.

Mallach is a faculty member at the University of Lowell in Massachusetts and a consultant to users and vendors.

Benchmarking Brainiac 1000

Artificial intelligence has a tough time just getting past the worm level

HARVEY P. NEWQUIST III



You may have heard a lot of talk this past year about neural networks, parallel processors, multiprocessors and other commercial and academic attempts to build computers on a scale closer to the human brain. But one thing you may not have heard much

about is what this effort actually means or what the new technologies are really accomplishing.

A friend at a neural network company told me that in terms of "biomental" evolution, today's products can compete head-to-head with a level of intelligence on par with a worm.

Only a worm, you ask? Yep, a worm. Attempting the feats of the human brain would require ... well, a human brain.

Let's take a look at the brain as if it were an actual production computer — the Brainiac 1000 — and see what it can do. Specifically, consider the brain of

an entertainer, say a singer such as Frank Sinatra, Sting or Bruce Springsteen.

Such a line of work is certainly not thought-intensive like nuclear physics or quantum mechanics; thus, it qualifies as a fairly normal activity that requires a "regular" amount of brain work. Here is our starting point for the brain/machine performance benchmarks.

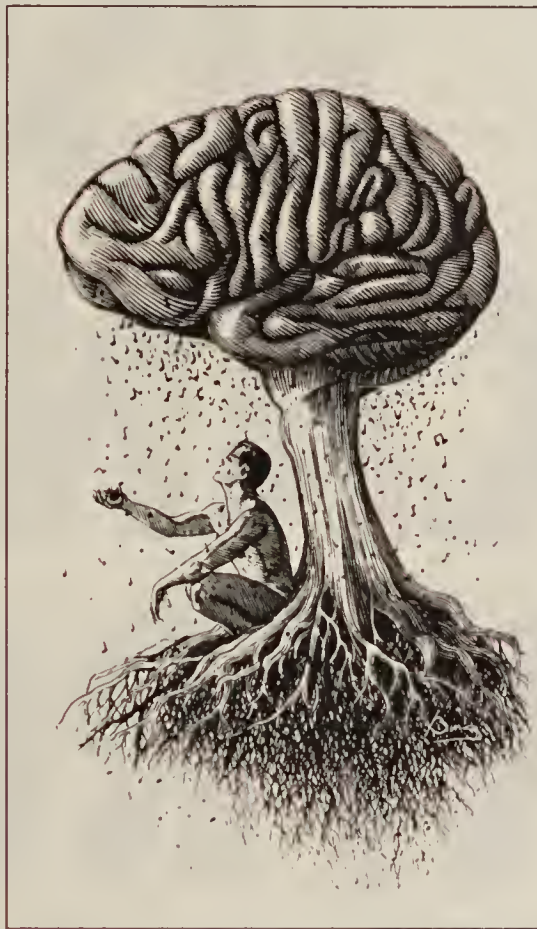
Let's say each of these singers has recorded more than 100 songs in various formats, including studio versions, live versions, radio broadcasts, promotional pieces, cover versions and so on. Each of the performers is equipped with a standard Brainiac 1000, which comes complete with audio signal recognition for accessing information using signals as inputs.

We will base performance on the "Bob Barker Benchmarks," actually known as the "Name That Tune" measurement scale. In our test, we play an excerpt from a song for four seconds, long enough for our singer to

recognize one of his own tunes.

Using full stereo reproduction of a particular song, it is quite possible that each second of information could contain 64,000 bytes of data (you can verify this number by observing how much space a musical sample takes up on a hard disk).

Four seconds multiplied by 64,000 bytes equals 256,000 bytes. Since the Brainiac is outfitted with two ears as input devices, the total number of bytes



CHRISTOPHER BING

in the incoming signal is doubled to 512,000. Thus, the Brainiac is receiving about half a megabyte of information during the four seconds.

The input has to be compared with the information contained in the Brainiac's database for the tune to be correctly identified. Given that the 100 songs run about four minutes each, that means they take up about 15,360,000 bytes of storage per song (64,000 bytes multiplied by 60 seconds multiplied by 4 minutes). Thus, 100 songs take up 1,536,000,000 bytes in the Brainiac's memory, or 1,536,000K bytes, or 1,536M bytes or 1.5G bytes.

In trying to find a particular song segment, half the database would have to be searched on average to achieve each match. So, 750M bytes of information must be checked in each five-second period to obtain the correct answer.

Tests show that under normal, sober working conditions, the Brainiac comes up with the right answer about nine out of 10 times.

Remember, we are dealing with organic matter that is actually accessing information by

way of electrochemical impulses. Even though such impulses are notoriously slow — about 100 feet per second — they still outperform electrical impulses over metallic conduits, which can travel about one foot per nanosecond or a billion feet per second.

The theoretical advantage in the electrical realm is about 10,000 to 1 over the electrochemical processors. Nonetheless, our Brainiac is consistently able to retrieve and correctly identify each song more than 90% of the time. So what gives?

Scale has a lot to do with it. There are some 10 billion neurons in the brain that have an estimated 10 trillion interconnections running among them, with an average lead width of about three microns.

Brain-washing machine

One of the largest and most awe-inspiring multiprocessor computer units on the market today — the Connection Machine from Thinking Machines Corp. — has 65,536 processors with which to manipulate information and is the size of a washing machine. The brain squeezes 150,000 times as many processors into the human skull.

Secondly, the Brainiac can deal with spatial and complex relationships not based on numbers or specific sequences. Even the most expensively benchmarked computer is an autistic savant, much like Dustin Hoffman's character in the movie *Rain Man*. It can calculate as fast as you can get the numbers into it. But try getting it to make a rational decision with no outside help, and the whole system breaks down.

Basically, the argument boils down to one fact: No one knows exactly how the Brainiac 1000 stores information. Thus, memory retrieval as I have described, or as any neural network model attempts to describe, is only theoretical at the very best.

Why can the Brainiac remember a four-minute song from a decade ago but not remember what it had during a 40-minute breakfast one week before? The answer cannot be found in any computer, even in those attempting to mimic the Brainiac or in the billions of neurons in the Brainiac itself.

The point of this whole exercise is simply to show you how difficult it is to try to replace the human brain with a hardware or software architecture of any type. Under even the simplest of conditions, the brain is still the original computer, and all other models — whatever their performance benchmarks — are imitators that crawl in comparison.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

FOCUS is the only fourth-generation language with anywhere near that many users.

And that makes us the number one 4GL on mainframes, minis, and micros.

Why? Because FOCUS does what a 4GL is supposed to do.

And if you're skeptical, make us prove it.

Just give us a call and we'll come to your place, install FOCUS, and create a prototype application that (and here's the trick) runs against your production database. Or, if you prefer, against FOCUS' own shared-relational database manager.

Either way, we'll do it in four hours. At no charge.

What's more, we'll write the entire application in the FOCUS language—with no exits to COBOL, FORTRAN, or C for the hard parts.

FOCUS is such a complete language you can use it to write almost any application—from heavy-duty transaction systems to any type of online inquiry system.

Moreover, FOCUS can directly access every major database system running on every major hardware platform.

We're talking about online access here, not merely batch data extracts. And FOCUS will address multiple databases simultaneously, and perform outer joins.

We'll take that a step further. If two computers communicate, a FOCUS user on one

can, via FOCUS on the second machine, access any major database running there.

FOCUS supports IBM 370, PC and PS/2, VAX/VMS, UNIX V, Wang VS and others.

With, we might add, full portability. An application developed in any of these environments will immediately execute in any other.

That means, for example, that you can use a PC as a workbench for mainframe application development.

SQL compatibility? However you need it, FOCUS can do it.

There's more. Developers' Windows let your professional programmers use a windowed interface to create window-driven applications quickly and easily. The result is great-looking software with a superior user interface.

TableTalk is the FOCUS point-and-pick windowed interface that lets your end users create their own inquiries, customized reports, or even relatively complex applications—using only the arrow keys and the enter key.

And FOCUS lets you set the security and access levels you want.

Sound too good to be true? It's not. But don't believe

this ad. Make us prove it. Just call 1-212-736-4433, Ext. 3700, and ask for details. And if you give the word, one of our technicians will come out to your place and make it happen.

Right before your eyes.

400,000 USERS CAN'T BE WRONG.

Who says we're number one?

"Information Builders' 4GL products were, once again, the only ones to lead in their niche in mainframes, minis, and micros. No other vendor has duplicated this feat in the seven-year history of this research effort."

—Software Magazine 1988 Software Market Survey

HARD TALK

Jean Bozman

Battle for high ground



Amdahl has good reason to feel confident this year. Revenue is up, and orders are piling in. Better yet, it has beat IBM at its own game three times over: Amdahl has a faster uniprocessor in the 5990, it has a more capable disk drive in the 6100, and it revised its UTS mainframe Unix system days before IBM said it would be late with AIX/370 shipments [CW, Feb. 20].

Amdahl has, therefore, positioned itself as the best alternative to IBM. Users, Amdahl executives say, get IBM compatibility, better price/performance and extra features such as UTS, which is able to run native on a mainframe without the help of VM as a host operating system.

But Amdahl executives may have reached too far in this king-of-the-hill game when they asserted recently that fellow plug-compatible manufacturer (PCM) National Advanced Systems (NAS) was no longer in contention. It is a charge that raises the specter of Amdahl being the only major PCM and the danger that customers will pay higher prices in an era of reduced competition.

NAS, which suffered slower sales and drooping profits last year, is in the midst of a corporate spin-off from parent National Semiconductor. Though still half-owned by National

Continued on page 28

ESA in VM's future

Release would boost storage, speed capabilities

ANALYSIS

BY STANLEY GIBSON
CW STAFF

IBM's next major release of VM, due in approximately 18 months, will offer Enterprise Systems Architecture capabilities, according to an IBM official.

"It is definitely a direction to have VM support the ESA architecture," said Bob McNamara, manager of Enterprise Systems software introduction at IBM. IBM's most recent enhancement to VM, VM/XA SP 2, began shipping in late December.

VM users are in the midst of digesting that release and reportedly are giving little thought to the next one. However, IBM has been briefing analysts and users, setting forth its general

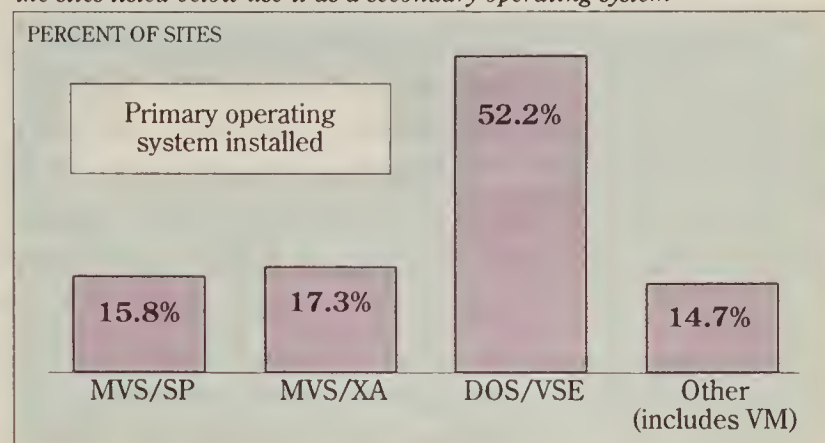
directions on a future release of VM with ESA capabilities.

MVS/ESA, announced approximately one year ago, has been available for about six months. MVS/ESA brings 16 terabytes of addressability to users and offers such performance-improving features as Data Spaces and Hiperspaces, which allow large chunks of data to reside in expanded memory, thus reducing I/O to disk and improving an application's processing speed. According to Focus Research Systems, Inc., 14.6% of IBM and plug-compatible mainframe sites plan a new operating system of some kind; of those, about one-third plan MVS/ESA.

Early MVS/ESA users report that the new operating system is significantly less difficult to install than MVS/XA. IBM would

VM in background

VM is not widely used as a primary operating system, but nearly half the sites listed below use it as a secondary operating system



SOURCE: FOCUS RESEARCH SYSTEMS, INC.
CW CHART: JOHN YORK

not release figures of ESA licenses thus far but did say there were significantly more MVS/ESA licenses in the first six months of the operating system's life than there were during the first six months of MVS/XA's availability.

IBM recently announced DF Sort, a software program that

keeps data to be sorted in Hiperspace rather than on disk. The program is batch-oriented.

VM, on the other hand, is oriented toward interactive use. McNamara said, however, that VM could make use of ESA functionality as well by allowing applications with very large memo-

Continued on page 27

Pharmacy net software checks insurance claims

BY AMY CORTESE
CW STAFF

The age of on-line verification is coming to retail drugstores and pharmacies. Soon these outlets will verify insurance claims just as retail stores authorize credit purchases.

Engaged in a joint effort, Stratus Computer, Inc. in Marlboro, Mass., and Dallas-based Shared Financial Systems, Inc. hope their recently announced Healthnet/2 system can be the remedy that pharmacies need.

With health insurance increasingly covering prescriptions, drugstores are taking more risks by honoring insur-

ance claims without being able to verify them on the spot. If a claim is rejected by a carrier for any reason, the pharmacy does not get reimbursed for the prescription.

Retail drugstores typically have no way of checking the validity of insurance eligibility. Additionally, the federal government has mandated on-line authorization of Medicare claims by 1991.

With Healthnet/2, according to the vendors, a patient's health insurance coverage can be checked on-line. The patient's insurance number is entered into the system, either by key entry

Continued on page 26

Sequoia hikes system power but not prices

BY ROSEMARY HAMILTON
CW STAFF

MARLBORO, Mass. — Sequoia Systems, Inc. plans to announce the next generation of its fault-tolerant computers today with promises of faster processors at current prices.

The Series 300 will be based on the Motorola, Inc. 68030 microprocessor and will be offered for approximately the same price as the current product line, the Series 200, according to Keith Johnson, Sequoia's vice-president of marketing.

The company will continue to

sell the Series 200, which was introduced in October 1987, even though the Series 300 has a faster processor and a similar price, Johnson said.

For example, a customer may want to add another Series 200 processor to its existing system, he added.

A typical four-processor Series 300 configuration, which supports up to 300 users, will sell for \$653,000, Johnson said. The system can be expanded to a 64-processor configuration.

An entry-level system with

Continued on page 27

Inside

- In step with liquor firm's system installation. Page 25.
- CDC adds three to Cyber 110 line. Page 25.
- HP's RISC-based architecture a hit in Europe. Page 25.

BIM Spotlight

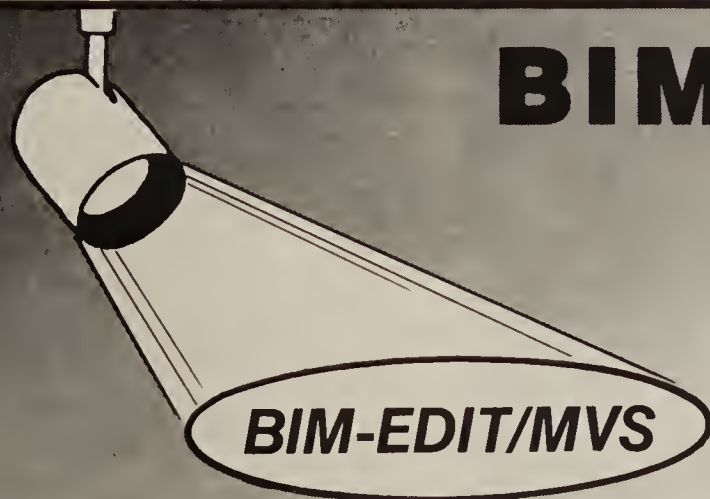
Imagine having access to an
MVS Editor from CICS, VTAM, IMS or TSO!

Our powerful, flexible, easy-to-use DOS editor is now available for MVS. BIM-EDIT/MVS does not require the use of TSO and its associated system overhead and can be accessed concurrently from CICS, IMS, VTAM, or TSO. With BIM-EDIT/MVS you can make an editor available to all users of the system and because TSO is not required support many more users than ISPF using significantly less system resources. BIM-EDIT/MVS is a full function easy-to-use editor with many features which should greatly improve the productivity of your applications or systems programming staff.

Call for full documentation or free 30-day trial.

Price: \$11,200, \$5600/yr, or \$560/mo.

BIM has over 20 system software products for improving productivity and use of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.



BIM

B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436

612-933-2885

Telex 297 893 (BIM UR)

Member Independent Computer Consultants Assn

"The Data General difference: For VARs, OA to make your application package more attractive."

Introducing CEO Light™, a new vision in office automation. It's software that's heavy on performance, but light on system demand and cost.

A streamlined version of our industry-leading CEO® office automation software, CEO Light can be efficiently integrated with your vertical solution. It can satisfy your customers' needs for OA functionality. Yet still leave plenty of machine for your all important customer application.

CEO Light incorporates only the most popular features of CEO—Electronic Mail, Calendar, Filing and more—minimizing demand on system resources. As a result, CEO Light is easy to use and maintain, and significantly lowers OA costs.

Plus, it can be tailored to your customers' individual needs. You can inte-

grate their existing word processor, so less training is required. Or, you can choose from either CEOWrite™ or WordPerfect®. CEO Light accommodates both.

CEO Light might be just the competitive edge you need to wrap up more business in your vertical market.

For more information, send the coupon below. Or call: 1-800-DATAGEN. In Canada, call 416-823-7830.

Data General

3400 Computer Drive, Dept. ADV/CEO/LT, Westboro, MA 01580

Name

Company

Address Phone

City State Zip

CALL 1-800-DATAGEN

CEO Light and CEOWrite are trademarks of Data General Corporation.
WordPerfect is a registered trademark of WordPerfect Corporation.

CEO is a registered trademark of Data General Corporation.

© 1989 Data General Corporation



S O F T
T A L K

Stanley Gibson

Benchmark
black magic

Is it real or is it benchmarking? Why is benchmarking such a joke? One reason is that vendors

usually assign the task to their marketing department. A marketing department will approach benchmarking not as the pursuit of truth but as an adjunct to sales.

Typically, any salesperson will marshal numerous facts to promote his product, frequently omitting inconvenient bits of information. The buyer must stay informed to know the right questions to ask and look for the facts that get left out.

Benchmarking works much the same way. The goal is always to construct a test that exaggerates a given product's strengths and minimizes its weaknesses.

Over the summer, DEC internally audited its systems running its DEC TP software. Whatever the results of that test were, we have yet to see them. Why? It stands to reason that if the results were good, then the whole world would have heard about them by now. Instead, some six months after those audits, Peat Marwick is retesting the DEC systems, at a time when some of the hardware has been superseded and more is about to be.

Too often, the auditor is put in the position of watching what

Continued on page 28

A distribution system for spirits

When importer needed a change, custom 9370 package was low-cost route

ON SITE

BY ROBERT MORAN
CW STAFF

FORT LEE, N.J. — When The Paddington Corp. booted up its IBM 9370 Model 60 last month, it was the last step in the spirits and wine distributor's search for distribution and financial software and a low-overhead synergy with its parent company's affinity for the IBM 370.

Paddington, whose primary brands are J&B Whisky, Baileys and Amaretto di Saronno, is a division of Grandmet Consumer Products, Inc. The rapidly expanding company had outgrown its old system, which was based on a Microdata Corp. minicomputer and a few IBM Personal Computers. The company wanted a new system but wished to avoid the systems programming overhead that developing new systems would entail.

Today, the 9370 Model 60 supports 21 terminals in headquarters and five regional offices

throughout the U.S. It runs everything from accounting to inventory control. In addition, 70 IBM PCs and ATs link the field sales force in regional offices to



Paddington's Greggor

headquarters via modems.

However, when Paddington started out, it could not find distribution control or financial systems that matched the peculiarities of operating in the liquor industry.

Paddington imports spirits

and wines that go directly from suppliers to wholesalers, sometimes from several companies to several locations in the U.S. In addition, some states control the liquor, and they warehouse the products at Paddington's expense. Since those states monitor shipments to liquor stores and draw upon a warehouse, Paddington bills the state.

"Most distribution packages assume that products are imported and then simply distributed," said Keith Greggor, Paddington's director of planning and development. "But all of our distribution paths must interconnect."

After a long search, Greggor chose to have his software customized. Although financial software was available under IBM's VM/IS, tying it with Paddington's distribution software would have required customization anyway, Greggor said.

Paddington chose the 9370 Model 60 because "The VM/IS operating system is easy to use

Continued on page 27

CDC joins
graphics
parade

BY JAMES DALY
CW STAFF

MINNEAPOLIS — Control Data Corp. became the latest firm to upgrade in the increasingly competitive high-powered graphics workstation market with the recent rollout of a trio of additions to its Cyber 910 line.

The three-model Cyber 910-600 series uses the power of the Mips Computer Systems, Inc. reduced instruction set computing (RISC) microprocessor to prevent CDC's high-end line from being left in the dust by its workstation competitors.

Firms such as IBM, Digital Equipment Corp., Silicon Graphics, Inc. and Prime Computer, Inc. offer similar price/performance machines and either sell Silicon Graphics workstations or the Mips RISC board on which the Silicon Graphics machine is

Continued on page 26

European users say moving
to HP RISC series a breeze

BY JANE LAWRENCE
IDG NEWS SERVICE

LONDON — Upgrading to Hewlett-Packard Co.'s Precision Architecture is like moving from a Model T Ford to a sleek 1989 model, data processing manager Malcolm Kilby says.

"We expected a leap forward in performance, and we got it," he said, noting that the only downside was trading in his HP

3000 Series 33 for a fraction of its original cost.

Kilby's firm, Malton Bacon in North Yorkshire, England, is just one of many European customers that have made the move from traditional HP machines to the firm's reduced instruction set computing (RISC)-based Precision Architecture.

HP would not give detailed figures but said hundreds have

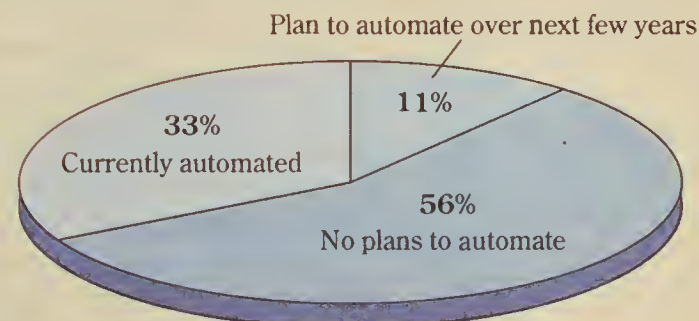
Continued on page 26

Data View

Minority automate load management

A survey of U.S. utilities revealed that more than half haven't automated load management functions and have no plans to do so

PERCENT OF RESPONDENTS (BASE OF 502)



SOURCE: NEWTON-EVANS RESEARCH CO.
CW CHART: DOREEN DAHLE

For IBM 3270, S/36/38, and AS/400 Users:

100% IBM 4224 Compatible!

Available Now!

With our plug-compatible ISI 7224 desktop dot matrix printers, you can print everything an IBM 4224 can print...and more.



We offer 200 cps and 400 cps models. Each prints high-resolution graphics, bar codes, and oversize characters with full IPDS support...now! Plus, our easy-to-use Escape Language lets you perform

these advanced printing functions without GDDM, BGU, or other special software.

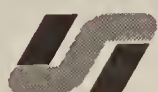
With an ISI 7224, you can switch instantly from continuous forms to cut sheets, then back to continuous, without

reloading or losing the top-of-form position. You also get no-waste demand-document tear-off without extra cost gadgets. Forms can have up to six parts.

Fully integrated, our ISI 7224 printers connect directly to your IBM systems — just plug them in and print.

Extra features and all, our ISI 7224 printers cost much less than their IBM counterparts.

For more information, call 1-800-544-4072 (in Michigan, 313/769-5900).



Interface Systems, Inc.

Printer Solutions for IBM Systems

5855 Interface Drive, Ann Arbor, MI 48103
Telex: 810-223-6058, FAX: 313/769-1047



► Our ISI 7224-X01 is a compact, economical 200 cps model.

► Our high-speed ISI 7224-XX2 prints at 400 cps in up to eight colors.

European users

CONTINUED FROM PAGE 25

been sold in the UK, thousands in Europe and many thousands worldwide.

The company now sells two Precision Architecture families — the HP 3000 Series 900, which runs the proprietary MPE operating system, and the HP 9000 Series 800, which runs Unix. In addition, HP still sells two of its traditional architecture systems — the HP 3000 Model 70 with MPE and the Unix-based HP 9000 Model 300 workstation.

The decision to run both Unix and MPE on Precision Architecture machines may be paying off despite past problems. Initially, the MPE-based systems were

delayed while HP ironed out the difficulties of running a proprietary operating system on a RISC machine.

But the effort was considered worthwhile: Existing customers can upgrade to Precision Architecture while preserving their investment in software applications either by running them in emulation mode or recompiling to run native.

There are also no problems with conversion, Kilby said. "HP did its homework, and you have to give credit for compatibility. There are hardly any problems with regard to software," he said.

London-based entertainment group Mecca Leisure was a beta-test site and moved from a Model 70 running MPE to a Model 950 running MPE XL.

Systems manager James Cohen went

to HP's migration center for upgrade help, first recompiling MPE to run under the native mode of the 950. Most of the code transferred easily, although some needed updating, Cohen said, who warned that the changes must be made before the software is moved to the new system.

Once converted, his system ran between five and eight times faster. Now, Mecca is installing a Unix-based Precision Architecture machine to run a specialized hotel package.

A computer systems manager at a UK stationery company who did not wish to be named was even more cautious in his approach to conversion. When he moved from an HP 3000 Model 52 to a 950 in 1988, he kept both systems running in tandem for two months.

CDC joins

CONTINUED FROM PAGE 25

based. CDC's workstations are made by Silicon Graphics, in which CDC has a 20% interest.

CDC officials said the Cyber 910-612, 910-622 and 910-624 are based on a design featuring tightly coupled, symmetric multiprocessors with shared memory and offer up to five times the processing power of CDC's other workstation models.

The 910-612 offers two 16.7-MHz RISC processors and two floating-point coprocessors, while the 910-622 has a pair of 25-MHz RISC processors and two floating-point coprocessors. The 910-624 has four 25-MHz processors and four floating-point coprocessors.

Each 16.7-MHz processor is able to process 13 million instructions per second (MIPS), and each 25-MHz processor can handle 21 MIPS, the firm said.

CDC said it will target the series at industries involved in computing-intensive, graphics-reliant applications such as computational fluid dynamics, molecular modeling, mathematical theory and computational chemistry.

A new high-speed bus between the central processor subsystem and the graphics subsystem results in graphics performance of 400,000 three-dimensional vectors per second, the firm said.

The machines run the Irix operating system — CDC's multiprocessor version of AT&T's Unix System V, Release 3 — and are compatible with Cyber's 910-400 and 910-500 series workstations, CDC said.

Standard software on the 910-600 series will include the Irix operating system, a C compiler and development environment as well as a window manager and graphics library.

The models also include a 182M-byte disk drive as well as 8M bytes of error-correction code memory. Memory can be expanded to 64M bytes on the base memory board.

The 910-612 is priced at \$94,900, while the 910-622 sells for \$114,900. The 910-624 is priced at \$139,900.

Pharmacy net

CONTINUED FROM PAGE 23

or magnetic strip reader. The system automatically dials up a database located on a Stratus computer at the drugstore's headquarters or at a third party such as Medicare or Blue Cross/Blue Shield. The database is then searched for information regarding the patient's eligibility.

The product, to be marketed by both firms, is targeted at large retail drug stores with \$200 million in sales. However, the application could be used by other health care organizations such as hospitals, insurance firms and health maintenance organizations.

"Most pharmacies in the \$200 million range just take cards with no verification," said Dick Jacobson, retail industry marketing manager at Stratus. He said large pharmacy chains can justify the investment in the hardware and software in one year.

The cost of the system ranges from about \$79,000 to \$1 million, depending on the configuration, according to Stratus, with the cost being split between hardware and software.

"I don't want to hear about trading 386 performance for portability...It's just not an option."



ZENITH INNOVATES AGAIN™

Today's leader in battery-powered portables gives you the first 386 laptop with all the options you asked for.

It's here. TurbosPort 386™. Created for one simple reason: You asked for it. Another Zenith Data Systems innovation for the way you work every day.

The lightweight TurbosPort 386 is a technological first loaded with one breakthrough after another. Like our *Page White* display, which virtually duplicates printed-page clarity. With sharp black images on a fluorescent backlit screen. And for ultimate speed, we've innovated far beyond our competition. To maximize your *Windows*-based applications in or out of the office.

TurbosPort is also the first 386 laptop to ride on Zenith's *Intelligent Power Management System*™. It gives you control of battery usage, so you'll always have the 386 performance you need. With no plugs. No cords to tie you down. You even get the desktop comfort of a detachable keyboard.

Now you no longer have to trade power for portability. And the proof is in the innovation. The Zenith Data Systems TurbosPort 386. The only portable to give you all the options of 386 desktop performance. In the office. Or anywhere.

For the name of your nearest Zenith Data Systems authorized dealer, call 1-800-553-0559.





THE QUALITY GOES IN BEFORE THE NAME GOES ON®

Graphics simulate Microsoft® Windows, a product of Microsoft Corporation. Microsoft® Windows is included with all hard disk models of Zenith Data Systems' advanced desktop systems.

©1989, Zenith Data Systems

ESA

FROM PAGE 23

ry requirements to move data into expanded memory.

One key benefit, he said, will be to provide faster access to common services in VM. For example, VM provides a common server for advanced printing. When a large number of users are accessing a single common service, a bottleneck can occur. ESA will allow data to be kept in expanded memory.

"There may be 1,000 users, and they may not need huge amounts of data, but they will need to access the same data frequently," McNamara explained.

Romney White, vice-president at Velocity Software, Inc., a Boston-based maker of VM utility software, concurred that this move would serve to boost performance. Currently, data has to be copied from one server's address space to another's. "I'm assuming you could share a data space between virtual machines," White added.

However, he noted that implementing ESA under VM will require users to purchase the expanded memory that will make the added function possible.

"IBM is trying to find a way to sell expanded storage to VM us-

ers," White said. He said users are not clamoring for capabilities of ESA. "This is a solution looking for a problem," he added.

One VM user, who asked to remain anonymous, said ESA capabilities are indeed a blue-sky proposition at this point. "It's an area where we don't know what capabilities we would use." He said improvements under VM/XA SP 2 offer better CPU utilization and should satisfy his needs for the present.

More users

According to McNamara, ESA will almost certainly allow VM to support more users. Currently, VM/XA can handle up to 5,000 users for IBM's Professional Office System. An ESA version of VM will allow twice that amount or more, he added.

In addition, ESA will allow the number of logical partitions under PR/SM to increase. Currently, VM/XA SP 2 supports a maximum of six partitions, although up to seven are supported on the largest IBM 3090 S models running MVS.

A VM with ESA will "definitely have Data Spaces," McNamara said. Hiperspaces under VM would work differently than under MVS and might thus carry a different name to avoid confusion, McNamara said.

Spirits

FROM PAGE 25

and compatible with all of the sister companies' operating environments," Greggor explained. However, he said he did not want to incur the additional expense of full-time staff programmers to build and maintain the software.

According to Greggor, the key to the decision was that sister company Carillon Importers Ltd. in Teaneck, N.J., which operates similarly but separately, was in the same position and could share the cost. As a result, each company paid \$600,000 of the \$1.2 million tab for the hardware, the customized software and VM/IS. Carillon, however, uses the IBM 9370 Model 50.

Paddington and Carillon decided not to use an IBM MVS-based distribution package developed by sister firm Heublein, Inc. in Farmington, Conn., which runs it on an IBM 3090 mainframe. According to Greggor, "The MVS solution would have required the additional cost of reprogramming for VM/IS and an IBM 9370 Model 90." Furthermore, the application "would have required too many people to maintain it."

The other solution, the Distribution Control System from

Arthur Andersen & Co, would have cost about \$200,000, Greggor said. "Customization would have driven the price to over \$1 million and required at least two full-time employees to run the software." Greggor added that he would have had to run IBM's DOS/VSE operating system, incurring the additional overhead of system programming personnel.

Financials later

Greggor had both the financial and the distribution systems, which are based on Focus, the fourth-generation database management system from Information Builders, Inc. in New York and built by Howard Systems International in New York.

Although the distribution package is completed and running, the financial package will not run until the first week of March. Fortunately, Paddington has a long lead time on orders, which are not scheduled to be posted until the March switch-over. Meanwhile, the orders are being entered into the 9370.

Greggor said that by next year, every employee will have access to the system. He also plans a connection to the company's suppliers in the UK, who support about 60% of Paddington's business.

Sequoia

FROM PAGE 23

two processors is priced at \$450,000. Both configurations include two 850M-byte disk drives, a 6250 tape drive subsystem and a license for the Sequoia operating system, Topix. The operating system is Sequoia's blend of the AT&T Unix System V operating system and Pick Systems' Pick operating system.

Johnson said the firm has tested the new system with the Debit/Credit benchmark, the evolving standard benchmark being defined by the Transaction Processing Performance Council.

Sequoia plans to make those results available in three months. Johnson said the company also intends to have the results audited by an outside firm.

According to Johnson, initial results show that the Series 300 offers 50% more performance than the Series 200, which underwent benchmark tests last year. The 200 performs an estimated 14 transaction/sec. per processor, Johnson said.

Since it was founded in 1981, Sequoia has remained a distant third to competitors Stratus Computer, Inc. and Tandem Computers, Inc. in the on-line transaction processing market.



The best route between your Novell LAN and a mainframe is just ahead.

Gibson

FROM PAGE 25

goes on and then simply certifying that he watched it — not that what took place was scientifically correct.

It is as though an auditor sat through a magic show, witnessed a rabbit being pulled out of a hat and then wrote up a report in which he certifies that he saw a rabbit being pulled out of a hat — that is, if the rabbit were indeed a rabbit and the hat were indeed a hat, facts for which he clearly cannot be responsible.

What the user community needs is someone to explain the rabbit-out-of-the-hat trick.

Ready when you are. Early Enterprise Systems Architecture users say that they are finding the system easy to install, but once they have it, what do they do with it? One user proclaimed that he was "positioned for the future." Sounds a lot like an expression that got its start within the hallowed halls of IBM. You may not need it now, but you will be "positioned well" for when you do — as if it will be unobtainable by then.

MIS mentor George Di-Nardo, executive vice-president

at Mellon Bank NA in Pittsburgh, once termed moving to ESA a no-brainer. Without question, it is being done on a large scale by big 3090 shops, particularly those moving to S models.

IBM will be dribbling out ESA-based goodies, such as the recently announced Hipersorting. Why not put yourself in a position to use them as they are released? But let's keep track of the flow of goodies to see that there is a generous supply.

Alas. VM will be getting ESA, as indicated elsewhere in this section, but will it be able to support a 3990 Model 3 controller first?

Part of IBM's Feb. 7 announcement was that, indeed, the basic functions of the 3990 Model 3 will be supported by VM/XA SP Release 2.

When?

December 1989. Advanced functions were not mentioned by IBM.

"Somebody overlooked something. It's a hell of a way to treat a strategic operating system," said VM guru Romney White of Velocity Software in Boston.

Gibson is *Computerworld's* senior editor, software.

Bozman

FROM PAGE 23

Semiconductor, it will soon be an independent unit of Memorex Telex.

"NAS has not been a very strong force in our marketplace over the last 18 months," said Amdahl President and Chief Operating Officer Joseph Zemke at an analysts' meeting recently. "We've always felt we controlled our own destiny and that we have a unique relationship with Fujitsu. I think our strategy and the execution of that strategy is probably what resulted in NAS being on the block."

Marketing Vice-President Ted Springsted pressed the same point as he counted down an impressive list of Amdahl's recent "wins." Among the most gratifying of sales, Springsted said, was the displacement of a four-way NAS processor at Baxter Health Care in suburban Chicago. Several Amdahl high-end machines recently went to Mobil Oil and Monsanto — both traditional IBM shops. Other machines were shipped to the Federal Reserve Banks in Boston and Atlanta.

Yet NAS, despite its troubles, is still landing machines in

high places. In the last three months, NAS has placed large machines at Delta Air Lines in Miami, McDonnell Douglas in St. Louis, Boeing Aerospace in Seattle, Chevron in San Ramon, Calif., and Goodyear Tire & Rubber in Akron, Ohio. It is selling nearly \$1 billion in hardware systems each year in comparison with Amdahl's \$1.8 billion.

Good for the competition

Friendly rivalries aside, keeping NAS in the game is actually good for Amdahl's business, says industry analyst Bob Djurdjevic, president of Annex Research in Phoenix. Traditionally, NAS has been the price-leader in the IBM mainframe market. But, as part of Memorex Telex, that probably will not be possible anymore, and the market will tighten.

But it seems that the simple act of acknowledging NAS' continuing role as an IBM competitor would underline the fragility of the PCM marketplace. IBM has, by varying analyst accounts, 80% to 90% of the worldwide IBM mainframe market. All PCMs combined — including Siemens AG in West Germany — sell just 11% of all IBM-compatible mainframes.

Outside observers have not-

ed that NAS, if folded into Memorex Telex's \$2 billion-plus empire, would make the overall company a \$3 billion PCM giant. This Memorex conglomerate would have a much broader product line than Amdahl's offerings. Memorex Telex executives have stated on the record that such a merger may be the eventual plan. But a full-blown merger will not happen until outside financing is raised to buy National Semiconductor's 50% share in NAS.

Let us hope that, despite Amdahl's rivalry with NAS, Amdahl's recent comments are just a facade. There was one sign, at least, that Amdahl felt some empathy with NAS' new situation. "It's always a little unsettling when one of your competitors is on the block," Zemke said. "We're just glad the deal came down and that all the speculation is over."

Maybe a touch more of that empathy would do Amdahl some good. For, as Ben Franklin warned those who wanted to go their separate ways on the eve of the American Revolution, "We must all hang together, or assuredly we shall all hang separately."

Bozman is *Computerworld's* West Coast bureau chief.

RabbitGATE. A faster, more reliable

If you need a fast, reliable, efficient way to connect your Novell LAN to an IBM mainframe, the signs all point to RabbitGATE™. No other gateway offers Novell LAN users more performance and flexibility.

RabbitGATE's comprehensive IPX/SPX support enhances Novell LANs and gives each workstation about 20kb of memory by eliminating the need to load NetBIOS. IPX/SPX also provides faster, more efficient network routing. And it

enables inter-LAN gateway access—for SNA, BSC, DFT, and X.25 networks.

And RabbitGATE support doesn't end with Novell LANs. It works as well with NetBIOS LANs. And like all Rabbit products, it provides

NEW PRODUCTS —
SOFTWARE**System software**

Computer Associates International, Inc. has announced Release 5.3 of CA-Dynam/TLMS, its automated tape volume and tape data set management system for the IBM MVS operating environment.

Enhancements reportedly include a direct interface to CA-11, the company's automated re-run and tracking system. The software package also includes the extension of expiration date support through the year 2049, the vendor said. Pricing ranges from \$15,600 to \$36,300, depending on configuration.

Computer Associates
711 Stewart Ave.
Garden City, N.Y. 11530
516-227-3300

Database management systems

A program said to reorganize IBM DB2 databases twice as fast as the supplied DB2 utility has been announced by BMC Software, Inc.

Called DB2 Reorg Plus, the product reportedly provides space management statistics and produces single- or dual-image copies with each reorganization. According to the vendor, the package improves performance and lowers costs by reducing CPU cycles.

A perpetual license for DB2 Reorg Plus ranges from \$15,000 to \$51,250, depending on CPU type.

BMC
P.O. Box 2002
Sugar Land, Texas 77487
800-841-2031

XA Systems, Inc. has announced a product for IMS Fast Path database users.

According to the company, IMS-Xpert Fast Path option will enable users to initialize, extract, load, edit and browse information located in the Fast Path database. The option — which works in conjunction with the IMS-Xpert System and software designed for manipulating IBM databases under TSO/ISPF, IMS/DC or CICS — is priced at \$10,000.

XA Systems

Building D
983 University Ave.
Los Gatos, Calif. 95030
408-395-1800

Information Builders, Inc. has unveiled a read-only interface between Focus for Digital Equipment Corp. VAX fourth-generation language and database management system and Software AG of North America's Adabas DBMS.

The Adabas interface allows Focus' reporting, graphics, spreadsheet and data analysis facilities to directly access data stored on the Adabas system. The software runs in a DEC VAX/VMS environment and is priced from \$1,750 to \$14,000.

Information Builders
1250 Broadway
New York, N.Y. 10001
212-736-4433

Development tools

Zanthe Information, Inc. announced that its fourth-generation application development environment is now available on the Unisys Corp. U5000 series of Unix-based computers.

Zim is reportedly based on the entity-relationship data model and includes a data dictionary, database query and update and forms manipulation functions.

Pricing for the Unisys U5000 version ranges from \$5,700 to \$37,500.

Zanthe
1200-38 Antares Drive
Ottawa, Ont. Canada
K2E 7V2
613-727-1397

Languages

Oregon Software, Inc. has announced that its Pascal-2 compiler is available for Intel Corp. 80386-based machines running the Xenix operating system.

Pascal-2 Version 2.2B Xenix/386 reportedly includes a debugger, assembly language interface, source-code formatting and procedure cross-referencing capabilities. The latest release costs \$995 for a single-user license and \$250 per year for support services.

Network licenses are also available.

Oregon Software
6915 S.W. Macadam Ave.
Portland, Ore. 97219
503-245-2202

Philon, Inc. has released Philon Fast/Cobol 1.5, a language compiler for Motorola, Inc. 68000 series-based systems running under Unix.

The latest version reportedly conforms to ANSI standard-

based Cobol X3.23-1985. The vendor said the product has been undergoing National Institute of Standards and Technology validation at the intermediate level since January, and a full high-level release is planned for release in the second quarter.

Philon Fast/Cobol 1.5 costs \$2,200.

Philon
641 Avenue of the Americas
New York, N.Y. 10011
212-807-0303

Applications packages

Prime Computer, Inc. has released Computervision Cadds 4X Revision 4, a computer-aided design system.

According to the company, the product provides integrated nonuniform rational b-spline geometry and solids modeling capabilities.

Features include the automatic execution of solids modeling operations, the ability to cut a solid with a sculptured surface and a production visualization package.

Cadds 4X Revision 4 is priced from \$10,500 for software only.

Prime
Prime Park
Natick, Mass. 01760
800-343-2540



gateway optimized for Novell's IPX.

a growth path consistent with IBM's System Application Architecture. Add to these advantages Rabbit's reputation for reliability and technical support and you've got a very convincing case for RabbitGATE.

For information that can put you on the road to flexible, high performance connectivity between Novell LANs and IBM mainframes, write Rabbit Software Corporation, 7 Great Valley Parkway, Malvern, PA 19355. Or take a faster route.

Call 1-800-RabbitC.
See us at
NETWORLD '89,
Booth #620

Rabbit
SOFTWARE

We've got them all talking™

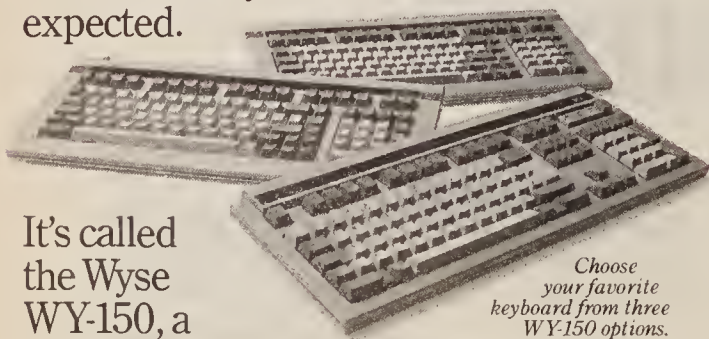


The Terminal Of The '90s Has Arrived A Bit Early.

Wyse introduces the WY-150.

They always said there would be such a terminal "someday". It would have the flexibility and connectivity to operate in virtually any computing environment, while meeting the most exacting ergonomic requirements. And, it would deliver those advantages at an affordable price.

"Someday" is here much sooner than expected.



Choose
your favorite
keyboard from three
WY-150 options.

It's called the Wyse WY-150, a breakthrough in terminal technology that will set price/performance standards for years to come.

Bridging the worlds of ASCII, ANSI and PCs, the WY-150 offers compatibility with a wide range of operating systems. Including UNIX/XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK. With a choice of three keyboards. And typical of Wyse, the WY-150 does it all with stylish design at a price that's also attractive.

The WY-150 also sets new ergonomic standards. Its 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out vividly.

The WY-150 is also part of *SystemWyse*. It links effortlessly with Wyse PCs and multi-user platforms to create uniquely

integrated and cost-effective solutions. Everything is designed, manufactured, and tested by Wyse to work together. And it's all backed by the service and support of the world's leading independent terminal maker.*

Only one question remains. Now that the terminal of the '90s is here, what are you waiting for? Call today for more information on the WY-150.

1-800-GET-WYSE

Wyse® is a registered trademark of Wyse Technology. SystemWyse and WY-150 are trademarks of Wyse Technology. Other trademarks/owners: UNIX/American Telephone & Telegraph; Concurrent DOS/Digital Research Inc.; PC MOS/The Software Link, Inc.; PICK/Pick Systems; MS-DOS, XENIX/Microsoft. *IDC 1988 U.S. Terminal Census.

WYSE

We make it better, or we just don't make it.

MICROCOMPUTING

M I C R O B I T S

Douglas Barney

Lotus lockup period to end



Lotus' cone of silence. For much of its history, Lotus has been close-mouthed about new products

and future strategies. Getting information was worse than pulling teeth — at least teeth usually come out.

In April 1987, the company tried an experiment. At its annual shareholders' meeting, the firm unveiled ambitious plans: Lotus' 1-2-3 Release 3.0; 1-2-3/M, along with a 10-year co-development agreement with IBM; 1-2-3/G; and perhaps most surprising, Lotus/DBMS, an advanced multiuser database with an array of graphical front-end tools. It also talked about Symphony 3.0, a version of the five-function beast that will use 1-2-3 Release 3.0 as its core.

This orgy of preannouncements was followed by a week of demonstrations and festivities called Lotus Week. This was the new, open, likeable Lotus.

The company has been trying to live down that fateful day ever since. That is because nearly two years later, none of the important stuff announced at Lotus Week has shipped, a situation that has earned the firm

Continued on page 31

OS/2 users search for puzzle pieces

BY DOUGLAS BARNEY
CW STAFF

After more than a year of availability, there is a host of corporate users anxious to get cracking with OS/2.

But these pioneers, with development projects already under way, are still waiting for all the pieces to come together, users said in recent interviews.

Here is what users said they need most:

- Key applications for OS/2 character and graphics modes.
- Broader distribution of Micro-soft Corp.'s OS/2 LAN Manager and IBM's LAN Server.
- Lower memory and hardware prices.
- Ashton-Tate Corp./Microsoft/

Sybase, Inc.'s SQL Server and other database server technologies.

- SQL-oriented development tools.

Bob McLean is one of many users who have essentially completed internal OS/2 applications. His firm, Host International, Inc. chose OS/2 for its 110 airport snack and gift shops to gain large memory and multitasking. Once it is up and running, end users will be able to do background processing.

"We have had a lot of instances where someone will have to shut down the system to let someone else do something," McLean said. That will end with OS/2.

But because Host's account-

ing system is tied into a variety of off-the-shelf MS-DOS applications, McLean must wait for OS/2 versions of tape backup, word processing and spreadsheet software. "Until they get here, we won't install it," he said. McLean said Host hopes to have the system in production by the third quarter, software vendors willing.

A. C. Nielsen Co.'s Nielsen Monitor-Plus in Wilton, Conn., also has ambitious plans for OS/2. Its main task is to track and analyze the impact of television commercials.

Project manager Rick Martin is spearheading the downsizing effort that will eliminate the need for the firm's Amdahl Corp. mainframe within two years. An-

choring the final stage of the downsizing will be the SQL Server that runs under OS/2. Martin is still waiting for the spring release of SQL Server and the second-quarter release of Sybase's screen tools.

Once these products are available, Martin and crew will
Continued on page 36

Inside

- IBM low-end systems president stays the course. Page 35.
- Apple discounts high-end models' prices. Page 35.
- Videotex releases electronic photography combo. Page 43.

Cornering the stock market

Micro vendors vie for brokerage desktop spots

BY WILLIAM BRANDEL
and DOUGLAS BARNEY
CW STAFF

Wall Street is not just a hotbed of trading activity: It is also a hotbed for vendors of high-performance desktop computers. These firms are currently trying frenetically to carve a slice of the lucrative trading market.

Although there is an array of offerings, the trend is clearly toward fast IBM and compatible personal computers with graphical user interfaces. However, brokerage firms handle many different types of trading, requiring different types of sys-

tems. Thus, PCs may never replace every Quotron Systems, Inc. terminal or high-end workstations. They may, though, ease out the majority.

PC allure

Part of the PC's allure is software. A hot player in this market is New York-based Multex, Inc., a firm that has made steady inroads on Wall Street. Its products vary, but what they basically do is allow the user to take in real-time information using Lotus Development Corp.'s Signal and dump the information into pop-up windows using Microsoft

Continued on page 41

Exec info systems catch on

BY MICHAEL ALEXANDER
CW STAFF

The software industry is readying to put senior executives online with executive information systems (EIS) in a big way, according to a recent study conducted by International Data Corp. (IDC).

Several information technology executives said they are seriously evaluating EIS but that software vendors will have to do

a better job of tailoring their products to the needs of their executives and to personal computer-based networks.

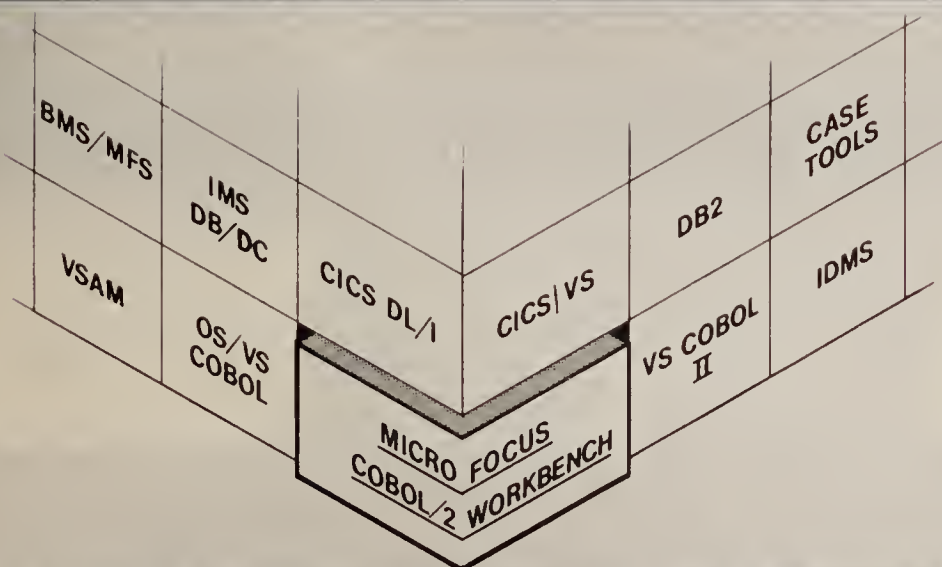
IDC, a Framingham, Mass.-based market research firm, predicted that the U.S. market for EIS will grow at a compound annual rate of nearly 40%, up from \$22 million in 1987 to \$115 million in 1992 (see story page 130).

IDC noted that expenditures for EIS software development, including the purchase of software, custom consulting and in-house software development, will climb to nearly \$350 million in 1992.

Executives traditionally have been reluctant to devote valuable time to learning and developing their computer skills, but

Continued on page 40

Mainframe technology, but PC productivity. Now!



Use Micro Focus COBOL/2 Workbench as the cornerstone of your application development strategy. The PC development environment based on COBOL/2 Workbench outperforms the host and provides programming, testing and debugging tools unavailable elsewhere. For the most efficient development of your mainframe applications using *any* of these technologies, call us now.

1-800-872-6265

Micro Focus, Inc.
2465 East Bayshore Road, Suite 400
Palo Alto, California 94303
United States
Tel:(415)856-4161

Micro Focus Europe, Ltd.
26 West Street
Newbury, Berkshire RG13 1JT
United Kingdom
Tel:(0635)32646

Micro Focus COBOL/2 Workbench™
The cornerstone of mainframe development productivity

MICRO FOCUS®
A Better Way of Programming™

Medical
00000546-2 DONNELLY, MARY

Patient No: 000005462

Patient Demographic Data:

Last Name: DONNELLY

Street : 96 ELM STREET

Choices

- 1: Enter Diagnoses**
- 2: Enter Case Data**
- 3: Enter Consults**
- 4: View Charges**
- 5: View UR Data**
- 6: View Results**
- 7: View Guarantor**
- 8: Select New Patient**

Selection: █

“Digital helps SMS maintain its position as the largest specialist in healthcare information systems.”

“We provide systems that give our clients the information, control, and flexibility to keep pace in today’s rapidly changing healthcare industry. And we’ve taken full advantage of Digital’s single system architecture, VMS™ software and related software tools to help us develop, install and support our products smoothly and cost-effectively.

“The software environment Digital provides helps make our ALLEGRA* Hospital Information System versatile and easy to use. Clients can easily modify the system without a programmer. That’s a big plus.

“Digital’s built-in flexibility also makes it easy for us to incorporate new technology into our products. And our clients can be sure that the software they buy today will run on the VAX™ systems of the future. So they have significant investment protection, too.”

The rewards of working together.

Digital’s flexible architecture provides access to tomorrow’s technology while protecting current investments.

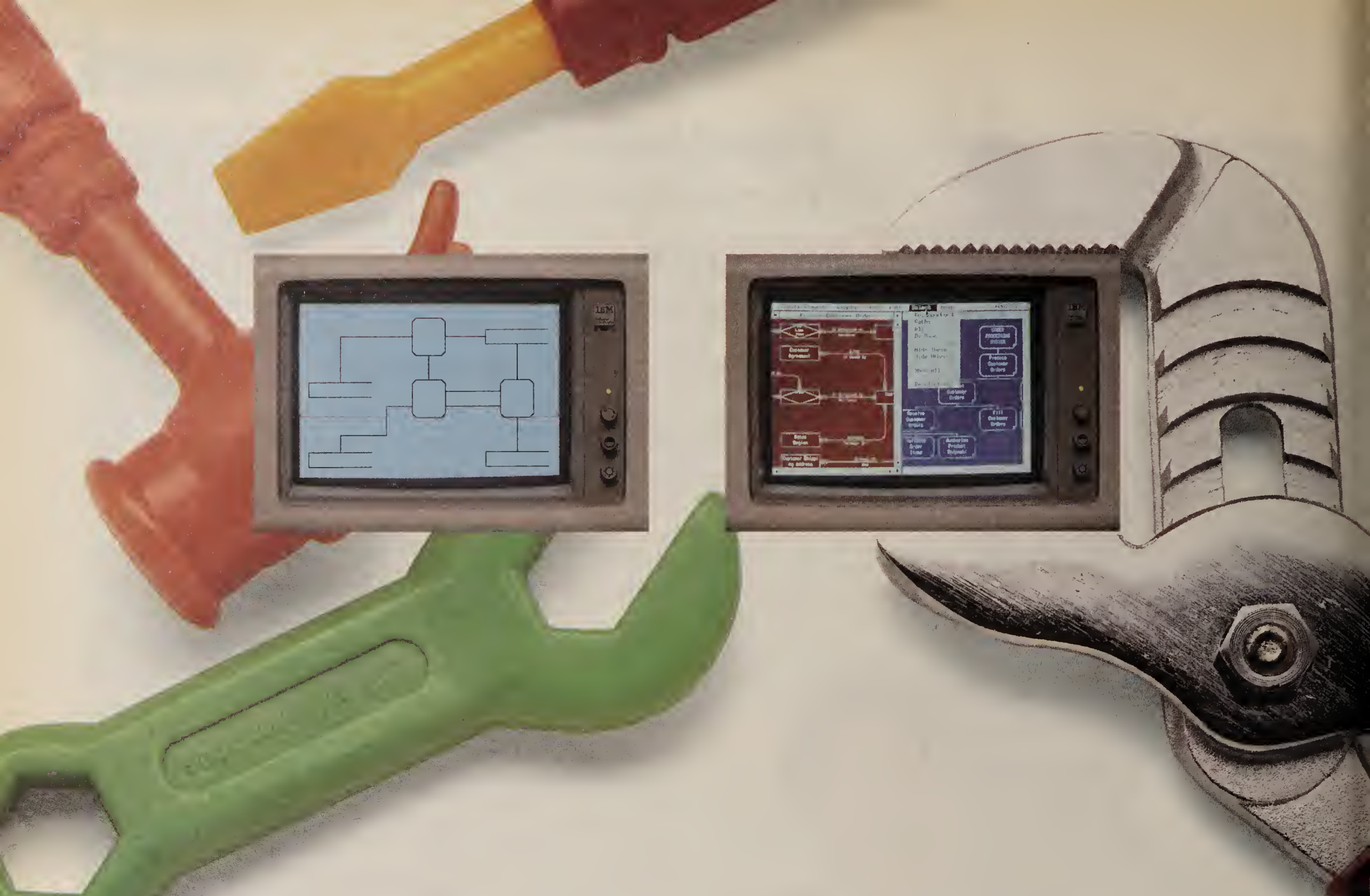
Today, with a consistent systems foundation that supports a wide range of applications, yet lowers development and expansion costs, Digital gives you an elegantly simple way for your people to work together more productively, more creatively, more efficiently, more competitively.

To learn more, write Digital Equipment Corporation, 200 Baker Avenue, Concord, MA 01742-2190. Or call your local Digital sales office.

A way to work together like never before.

Digital
has
it
now.

—Jay Rose, V.P.
General Manager
Turnkey Systems
Division, SMS



For CASE tools you won't outgrow, choose KnowledgeWare: Real tools for real work.

Most CASE tools look impressive when you first try them out. But many are disappointing when you get down to real work. You may be able to draw a lot of diagrams. But in one way or another, the tools prove deficient when you start building and modifying full-scale systems.

You can do better. Simply choose the tool set designed with real work in mind: the Information Engineering Workbench® from KnowledgeWare.

Real tools that can generate complete, working applications

Our PC-based tools for planning, analysis, and design let you capture all of your application requirements and specifications as diagrams. If you wish, you can then use those diagrams to *automatically* generate 100% of the COBOL source code with our mainframe applications generator, IEW/GAMMA.™

Real tools to support DB2 and other file access methods

Diagram a relational database and our tools can generate SQL DDL and DML statements *automatically*. This means that people using KnowledgeWare tools don't have to be experts in DB2. Plus, they can develop complex systems with more than one DBMS strategy. Like systems that use both VSAM and DB2, in either on-line

or batch modes. And once you have a logical data model, our tools will *automatically* transform it into a physical database.

Real tools with re-engineering capabilities you can use today

Our load utility lets you capture and reuse or modify existing IMS database definitions and COBOL data structures. Our tools can generate diagrams based on your existing IMS data definitions *automatically*. You can also load COBOL record descriptions and *automatically* create the associated data structure diagrams.

Real tools with a common Encyclopedia to ensure consistency

Since all of our tools share a common Encyclopedia, information is consistent throughout the entire development process: Any changes made with one tool are *automatically* reflected in the diagrams and definitions of the other tools. As a result, developers can focus on design instead of focusing on hunting down inconsistencies.

Real tools with the flexibility to fit your way of working

With KnowledgeWare tools, you're free to build applications almost any way you like. Ideally,

you might start with the planning tool, move to the analysis and design tools, and then produce a working application with IEW/GAMMA.

But if that's not the way you work, you can start application development with any KnowledgeWare tool. For example, you can do some design and then go back and work on analysis. Plus, you can choose from a number of the most commonly used methodologies and techniques. In short, you can put our tools to work without giving up methods that already work for you.

Call 1-800-338-4130

For more information on our Planning, Analysis, and Design Workstations, or any of our mainframe CASE tools, call our toll-free number (in Georgia, call 404/231-8575). KnowledgeWare, Inc., 3340 Peachtree Rd. N.E., Suite 1100, Atlanta, Georgia 30026.



KnowledgeWare®

*The World's Most
Comprehensive CASE Tool Set™*

S M A L L
T A L K

Michael Alexander

It's never
too late
to learn

A friend called me recently. He's a top executive at a luxury hotel that is in the midst of undergoing a significant — several million dollars' worth — renovation. For more than a few months, he has been wrestling with selecting and installing a costly computer system for the hotel's front-desk operations.

After we had lamented the end of the football season, compared the weather on each side of the country and exchanged other pleasantries, my friend began recounting his difficulty with making sense of all of the new technology he has been forced to absorb.

He has had to talk to dozens of vendors, compare several bids, even attend classes to get a better fix on what is considered state of the art in the hotel business. He admitted that many times he has been utterly baffled by the technology.

During our conversation, he asked me whether I thought he should personally use a desktop computer. "After all, I can hardly be expected to be a typist, but on the other hand, I can't help but think that it would be easier for me to understand the hotel's computer needs," he said.

After mulling it over for several seconds, I replied that I

Continued on page 40

IBM's new low-end systems
president stays the courseBY WILLIAM BRANDEL
CW STAFF

BOCA RATON, Fla. — In many ways, IBM's new Entry Systems Division President James Cannavino is like U.S. President George Bush. In both cases, staffers speak of a "kinder, gentler" approach.

But like any high-ranking politician, Cannavino must sell a skeptical industry on an ambitious strategy, which in this instance includes selling a memory-demanding OS/2 and OS/2 Presentation Manager operating system combination while memory prices are still high. Most users continue to balk at the expense of upgrading to an operating system that has precious-few important applications. That will not change until DRAM becomes viewed as a nice four-letter word again.

As the successor to William Lowe, a long-standing IBM executive, Cannavino also speaks

of staying the IBM Personal System/2 course. Part of that message includes the reiteration of the overall Micro Channel Architecture (MCA) strategy. Cannavino said that the MCA will improve in an evolutionary, compatible manner. In short, there will be no new Micro Channel, as published reports had speculated.

In other words, expect business as usual in IBM's low-end systems product strategy under Cannavino. "I don't see any major changes in store," Cannavino said in an interview at IBM's Boca Raton facility last week. In fact, most believe that IBM's most dramatic Personal Computer announcements, such as OS/2 and the MCA, have already been made.

Coming-out party

The week marked Cannavino's coming out, his first major public appearance since succeeding Lowe in December. The

straight-talking Lowe resigned as president of the Entry Systems Division to take an executive position at Xerox Corp.

When Cannavino's promotion was announced, IBM corporate customers were still anxious to see a compelling reason to switch to the MCA, such as add-in boards that would provide previously unseen capabilities. They were also anxious to learn how the PS/2s they had already purchased fit into IBM's Systems Application Architecture umbrella. These two issues are only slowly being explained by IBM.

Cannavino acknowledged that new MCA-based products are in the offing. These include systems using the Intel Corp. 80386SX processor as well as a laptop using the MCA. Further details were not forthcoming.

Dangerous approach

While analysts speculated that Cannavino's mainframe background would lead to a repositioning of the personal computer in IBM's strategy, that is not entirely the case. Cannavino, however, did caution that PCs should interact with mainframes in fairly limited ways.

For instance, Cannavino cited the danger inherent in "notions that workstations would have direct access to mainframe operations."

"When you give the PC direct access to the mainframe, you are interrupting six tons of muscle to let it know that you hit a key.

That is not efficient use of a network or your mainframe," Cannavino said. "You want your mainframes to mainframe." He added that with the proper system role definitions, workstations will not cannibalize IBM mainframe sales but complement them. This runs contrary to the downsizing pundits who credit PCs with the certain demise of the mainframe.

Despite being coy about

IBM's plans to create synergy between mainframes and microcomputers, Cannavino hinted of things to come. "We are right on the edge of an explosion," he said of the PS/2 family. "In 1989, it will become obvious why we did what we did with the Micro Channel.

Soon you will be able to drop in a bus master card that will make a Model 50 perform like a Model 70."

The new IBM PC chief argued that customers are not displeased with the quantum leap from Personal Computer AT-based systems and applications to the MCA. But while stating that he expects MCA sales to eventually outdistance AT-based system sales, he said there are no plans to ever discontinue the AT line. "We have had very little — if any — reaction from our customers saying, 'You did the Micro Channel thing wrong.' But nor are any of us going to give up the AT market opportunity," he said.

As Lowe did, Cannavino argued that upcoming versions of the PS/2 will support multiple users on a single hardware platform. "You get a system as sophisticated as OS/2, and multiuser is not a long way to go," he said. And like Lowe, Cannavino was vague in laying out the details of OS/2 multiuser strategy.

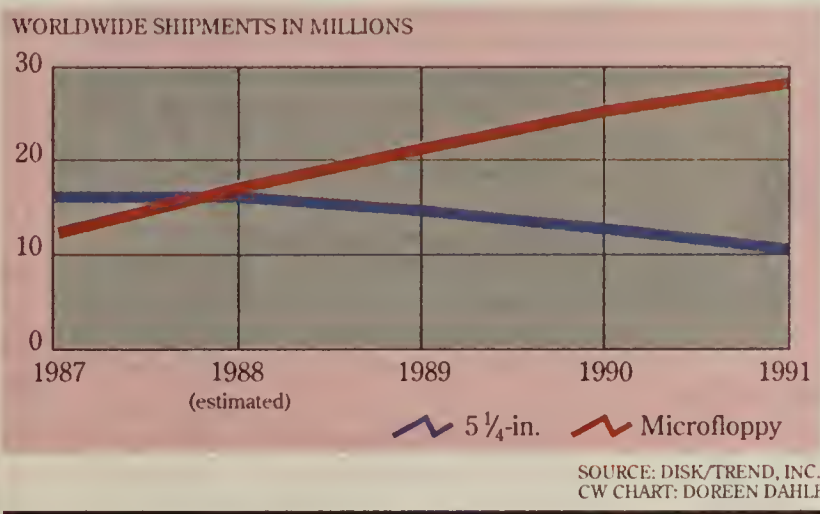


IBM's Cannavino

Data View

Driving up and down

By 1991, shipments of microfloppy disk drives are projected to outnumber those of 5 1/4-in. drives by a margin of almost 3-to-1



Apple continues to slash Mac prices

Discounts offered to high-end users buying in volume, through resellers

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. has taken another stab at lowering prices for higher end models of its Macintosh personal computers through new discount programs for end users.

According to an Apple spokeswoman, peripherals for the Mac have been dropped in price by up to 50% for customers who buy through resellers. Further, customers who buy through resellers will receive a rebate. The discount applies to the Macintosh II and Macintosh

IIx, the Macintosh SE and the Apple IIGS lines.

National accounts — users who buy in volume — will receive free systems per each large order. For example, a national account will receive a free Macintosh II with a 40M-byte hard disk drive for every four Mac IIs it buys. Customers who purchase Mac SEs with dual-floppy disk drives will receive a free system for every 11 units they purchase.

Peripherals too

High-end peripherals and systems are eligible for better discounts under the program.

"We're attempting to achieve parity between the two programs," the spokeswoman explained. "It will be their choice whether they purchase through the dealer or through Apple; they won't be penalized for either decision."

Both promotions will be in effect until March 31.

Apple is attempting to redirect sales toward more fully configured systems in its product line, the spokeswoman noted. Last summer, Apple raised prices for its more fully featured Macs by between \$400 and \$1,100. The price hike was greeted with widespread criticism from Apple customers.

cism from Apple customers.

As a result, demand shifted toward Apple's less expensive, less fully configured Macintoshes. At the same time, Apple began purchasing memory components at industry-high prices in an attempt to meet customer demand.

Subsequently, prices for dynamic random-access memory began to decrease, leaving Apple with its stockpiles of expensive memory chips and customers who wanted stripped-down Macs.

Revenue decrease

Apple reported that revenue is expected to drop in the current quarter because of the price increases and the decision to stockpile memory.

In January, Apple made its

first move to alter customer buying patterns, trimming prices on higher end Macs and peripherals.

Mike Bailey, president of Apple Professionals Exchange and a systems integrator at Lockheed Missiles and Space Co., said price reductions are a step in the right direction.

"They're trying to stimulate sales," Bailey said. "They've made some tactical errors and now they're trying to do some damage repair."

"They're especially trying to stimulate more activity in the corporate market," he continued. "I think they turned off some large customers with the increases last year."

However, Bailey said Apple salespeople have yet to approach him regarding the discount.

OS/2 users

CONTINUED FROM PAGE 31

complete the job of porting both local-area network and mainframe applications to SQL Server.

NASDAQ, Inc. has completed work on an OS/2 server-based application for software distribution. The program, aimed at systems administrators, will distribute the software to 1,400 traders. The server will hold data files and program files for users and will provide the most up-to-date software for each. Unlike other firms, NASDAQ has all the pieces it needs.

NASDAQ's OS/2 application will save the firm time, effort and money. Today, whenever there is an update to the workstation software, NASDAQ's MIS staff has to produce and distribute 1,400 floppy disks, many with specific configuration

information, which takes five to seven days, Flynn said. Once the OS/2 system is up and running, that same task will take 45 minutes. The firm also plans to begin designing a system that will bring OS/2, and eventually IBM and Microsoft's OS/2 Presentation Manager, to traders' workstations. There is no time frame for these projects.

Microsoft Windows advocate Art Block is willing and anxious to move to OS/2. Block's Intel Corp. 80386-based micros with high-resolution graphics and 4M to 8M bytes of random-access memory are also ready. The Manufacturers Hanover Trust Co. vice-president said he is simply waiting for OS/2 Presentation Manager applications. Like so many other pieces, there is no telling exactly when these applications will arrive.

Barney

CONTINUED FROM PAGE 31

a reputation for putting its vapor where its mouth is. The only thing that has changed since then is the company's image.

For a while after Lotus Week, the firm was still forthcoming. It announced Blueprint, a communications protocol, 1-2-3/Mac and a version of 1-2-3 for DEC's VAX.

Forget what we said

But the product delays have hurt Lotus badly. And, it seemed, every time the company announced a product, the press and competitors would simply point to all the unshipped ones. Lotus would prefer we forget that series of overzealous announcements. In fact, we often do and have to look up old press releases to remember what was said so long ago.

Lotus is not entirely to blame for its delivery problems. Lotus/DBMS and 1-2-3/G both require the IBM and Microsoft OS/2 Presentation Manager, an environment that many still call unstable. Release 3.0 was developed largely under OS/2 and has had difficulty fitting back into the lesser confines of MS-DOS. These factors have made Lotus no less sensitive to the barbs that are a part of everyday life for key company execs.

So Lotus has gone back to its roots and decided to shut up. It isn't on the front page anymore. It isn't even on the back page. It is simply biding its time, waiting to ship some stuff so it can start to brag again. Like Ronald Reagan, the company apparently prefers no press to bad press. In short, Lotus has gone dark.

This is not entirely bad. But it is not entirely good either. You see, customers still need information about when things are coming, what they will look like, what they'll require and how much they'll cost. Lotus is barely talking about products it announced nearly two years ago.

Another pretty interface

For instance, I like database software. I don't really use it. I just like to look at it. If I want to simply look at a prototype of Lotus/DBMS, I have to sign a nondisclosure agreement. If I ask how much room I'll have in a 640K-byte machine for a spreadsheet under Release 3.0, I still get a "no comment." Even some large corporate customers are getting this silent treatment.

Lotus won't keep quiet forever. At every corner of the company, groups are excited about their projects and anxious to talk. But the pressure on employees to keep things secret is so immense that some have coined the new corporate slogan, "Loose Lips, Pink Slips."

The corks started to pop out last week when the firm finally announced beta shipments of 1-2-3 Release 3.0. But information is still slow to seep out. Even though disks are falling into users' hands, Lotus has yet to let us in on such details as whether the system will require an IBM Personal Computer AT or above and how much memory will be needed to get some useful work done. From there, there are just a few more areas in need of elaboration, such as Lotus/DBMS, 1-2-3/G, 1-2-3/Mac, 1-2-3/VAX and Symphony 3.0.

Barney is a *Computerworld* senior editor, micro-computing.

Field Service Management Systems

Putting one on-line takes over 100 man-years and 3 million lines of code.

Automating customer service can be a major programming challenge. So if you have enough challenges, look into FIELDWATCH™ software—the world's leading system for the support and management of service organizations.

FIELDWATCH software. It's flexible, efficient, easy to implement, and runs in a variety of mainframe, mini and micro environments. Call extension 580 at 800-247-1300 (617-272-4100 in Mass.).

FIELDWATCH™



The DATA Group Corporation
77 South Bedford Street
Burlington, MA 01803
West Coast Sales Office:
1750 Montgomery Street
San Francisco, CA 94111

A NYNEX Company



"Cache in
your
processor"

SDI
20 years of Software Innovation

For Instant access to your critical application files
with **CACHE MAGIC™**

Improve response times making your users more productive
and allowing you to process more transactions.

Reduce batch run times knocking 2 to 4 hours off nightly batch processing,
insuring the online system gets up on time.

Save hardware dollars postponing and possibly eliminating
upgrades of CPU, DASD, and Control Units.

CALL TODAY. 1 (800) 537-1969

(415) 572-1200 In Europe: +31 10 436 12 77 1700 S. El Camino Real, San Mateo, CA 94402

Sign up now...
for the **FREE**
INGRES
seminar
in your area.

Reservations are going fast! Make sure you have a seat at our FREE seminar. To register, check the location and date of the seminar nearest you, then call us toll free, in the U.S. and Canada, at:

1-800-4-INGRES
(1-800-446-4737)

U.S. SEMINARS

CA	Los Angeles	Feb. 8
		Mar. 14
	San Francisco	Feb. 9
	San Diego	Feb. 14
	San Jose	Feb. 7
		Mar. 15
CO	Denver	Feb. 8
CT	Hartford	Feb. 22
DC	Washington	Feb. 9
		Feb. 17
		Mar. 22
GA	Atlanta	Feb. 7
IL	Chicago	Feb. 2
		Mar. 23
IN	Indianapolis	Mar. 14
MA	Burlington	Mar. 23
	Cambridge	Feb. 2
MI	Detroit	Feb. 21
MN	Minneapolis	Feb. 15
MO	Kansas City	Feb. 23
	St. Louis	Feb. 16
NC	Raleigh	Feb. 23
NJ	Princeton	Feb. 14
	Saddle Brook	Feb. 8
NY	Albany	Feb. 15
	New York City	Feb. 21
OH	Cincinnati	Mar. 23
	Cleveland	Mar. 8
OK	Tulsa	Feb. 9
OR	Portland	Feb. 22
PA	Philadelphia	Mar. 23
	Pittsburgh	Mar. 8
TX	Dallas	Feb. 7
	Houston	Feb. 14
UT	Salt Lake City	Feb. 16
WA	Seattle	Mar. 14
WI	Milwaukee	Feb. 16

CANADIAN SEMINARS

ALB	Calgary	Mar. 14
BC	Vancouver	Feb. 7
ONT	Ottawa	Mar. 9
	Toronto	Feb. 9
		Mar. 21
QUE	Montreal	Feb. 2
	Quebec City	Mar. 8

INGRES
RELATIONAL TECHNOLOGY

1080 Marina Village Parkway
Alameda, CA 94501

Break Through Applications Bottlenecks With INGRES Relational Database.



©1988 Relational Technology Inc. Printed in U.S.A.

To shatter applications development bottlenecks, you need power and flexibility. INGRES provides a complete development environment combining the necessary Tools, Power, and Access. In addition, hundreds of ready-to-use INGRES-based business solutions are available.

Tools INGRES offers an unmatched integrated application development environment providing CASE, 4GL, SQL and visual programming methods. These facilitate complex applications prototyping and deployment while providing independent end-user query and reporting capabilities. Applications are instantly portable across multiple hardware platforms.

Power The INGRES high performance SQL database engine provides OLTP power to support production applications in single or multi-CPU and distributed environments. A unique AI-based query optimizer maximizes processing efficiency.

Access Only INGRES integrates existing data into your applications through flexible access tools. Gateways to access existing data. Networks to tie your systems together. The most advanced distributed technology to integrate islands of information. Access to your data wherever it resides. Find out how your company can break through applications bottlenecks—like thousands of companies worldwide—with INGRES Development Tools. Attend a free INGRES seminar.

Call 1-800-4-INGRES



INGRES
RELATIONAL TECHNOLOGY

Corporate Headquarters: 1080 Marina Village Parkway, Alameda, CA 94501, (415) 769-1400
International Headquarters: Anchor House, 15-19 Britten Street, London SW3 3TY, UK, + 44 1 351 7722

CW

NSC

OUR
65,000th
TOWER

HOME
65,000th
ONE

WHILE OTHERS WERE DEVELOPING THEIR UNIX SYSTEMS, WE DEVELOPED A FOLLOWING.

The NCR Tower® Family is the nation's bestselling line of multi-user commercial UNIX® systems.*

We earned that market leadership by the leadership we displayed as a company in developing the commercial UNIX market. Right from the start.

While other major computer vendors tried to shore up their proprietary lock on the market, we saw that the market was turning to open systems.

We endorsed the UNIX operating system early. We enhanced it for the commercial market. With features like record and file-locking, Power Failure Recovery, Bad Block Handling, Error-Correcting Memory, and more. And now, we have a solid eight years of experience supporting UNIX systems. More than just about any major computer company around.

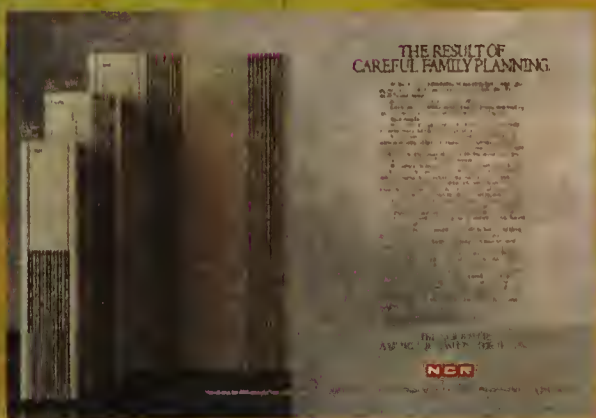
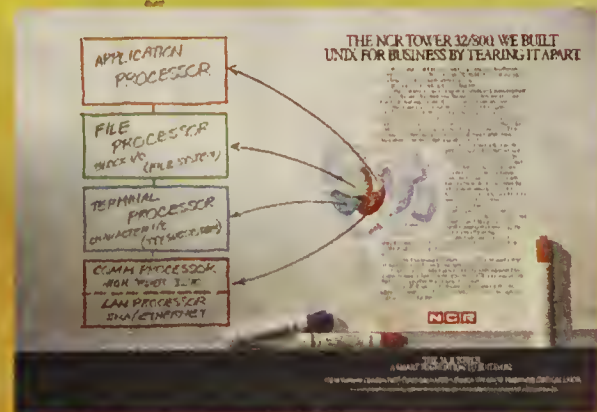
We know our way around the chip architecture, too. After all, over the last eight years, we've been one of the world's largest consumers of Motorola 680XX chips.

We've also developed a following for our nit-picking fanatics and their dedication to quality. It's a commitment that starts with a design engineering team that includes a Quality Assurance and a field service engineer. To make sure that what we build is built right and is easy to service. A commitment backed by rigorous testing that far exceeds industry standards.

And finally, we've become the leader by providing our customers with a family that is software compatible. That lets you move from two to hundreds of users without jeopardizing your software investment.

Phone 1-800 CALL NCR today for the name and number of your nearest NCR representative or authorized NCR Tower distributor.

And follow the leader.



THE NCR TOWER FAMILY. A Smart Foundation to Build On.

Creating value

Info systems

FROM PAGE 31

new technologies are shortening the training time. Graphical interfaces, mice, touch screens and other tools enable executives to quickly learn how to use information systems, IDC researchers said. Not only do these tools make it easier for execu-

tives to use information technology, but they also flatten the learning curve, making the process more economical, according to IDC.

MIS is finding it easier to design EIS programs, thanks to the increasingly widespread availability of powerful application development programs and relational database technology, IDC reported.

"In a nutshell, its time has come," said Lloyd Belcher, coordinator of executive information systems at Conoco, Inc. in Houston. "The components that have been brought together are technology, namely the PC and local-area networks, and a realization that information is a commodity."

There is also the awareness on the part of executives of the

value of information as a competitive weapon, he added.

"Classical mainframe orientation was toward getting large reports to an executive rather than just the important pieces of data," Belcher said.

Conoco has spent five years developing and refining its EIS, according to Belcher. "It has not been totally painless," he conceded. "The interesting thing is

when you start, the executives don't know what they want."

Information systems managers have learned from past mistakes in efforts to implement EIS. Often, an EIS failed because of the inability of executives "to describe an indescribable product," Belcher said.

Software lacking

While most IS managers agree that the hardware technology is adequate for EIS, the available software is lacking.

"From the point of view of MIS, the software is really not there yet," said Howard Campbell, data center director at Ashland Oil, Inc. in Lexington, Ky. "It's a question of, do you want to roll your own environment and have to maintain it for the rest of your life or wait for the commercial stuff? When we last looked at it a few years ago, we weren't satisfied. We're looking at it again now, though."

Much of the available com-

Viruses Worms Hackers.

**Before they call on you,
call on us...
1-800-327-4440.**

© 1989 Racal-Milgo

Is your private network really private?

Estimates vary, but by one U.S. Department of Justice survey, the average take for today's computer thief is \$883,279. Compared to only \$6,100 for a traditional bank robber.

As if financial losses weren't bad enough, now viruses and worms are infiltrating networks. And every day, more people shake hands with their first computer.

How many will use their knowledge as a weapon?

It's enough to make you feel like a sitting duck. Or make you want to get your ducks in a row... with our SAVE

(Secure Access Via Encryption) Program.

No, SAVE can't stop dishonest employees. But it can prevent unauthorized access by outside hackers. The program is a unique combination of modems, encryption, and support services. And your opportunity to implement greater data security at substantial savings.

Let us save you worry, hassles, time, and money.

SAVE is the affordable turnkey solution. As the leader in secure networking, we have the products and expertise to protect your data. And the resources to provide total customer support.

We can pre-key the system, install and maintain it, and train your personnel. And for a limited time, you get integral encryptors, at no cost, when you purchase compatible Omnimode® or RM Series modems.

Building better networks



Or up to 65% off Datacryptor® 64 standalone encryptors. Or a 30-day free trial of Datacryptor 64s, installed with no obligation. And all three offers include free installation and key set-up.

For details, call toll-free today (in Florida, 1-305-476-4811). And take advantage of how Racal-Milgo is reaching beyond today's standards.

Racal-Milgo®
RACAL

Alexander

FROM PAGE 35

could not see how he has managed to get by for so long without a personal computer on his desk.

Given the competitive nature of the hotel industry and the demands of harried business travelers who want to check in and out at blinding speed, choosing the right computer system has long-term, strategic importance for the hotel. It's a big-money decision that only comes after considerable deliberation.

If you had at least a working knowledge of PCs, it would go a long way toward helping you make the bigger decisions on how to strategically use information technology, I said. Using PCs may be the only way that you can learn what information technology can and cannot do.

What's more, I said, your use of a PC, even if only occasionally or for a specific task, sends a message to every staffer — especially the executives who report to you — that using information technology is vital to the hotel's competitiveness.

I am familiar enough with my friend's job to know that much of his time is spent poring over spreadsheets that detail room occupancy rates, food and beverage sales, salaries and benefits and similar information. When the numbers don't jibe or when he decides that he hasn't had enough "what ifs" to ponder, he asks a subordinate to rerun the numbers on a PC and produce new spreadsheets. It usually takes a few days before all of the information my friend needs is back in his hands.

I told him that if he knew at least enough about PCs to massage numbers in a spreadsheet,

mercial software is not adequate, concurred Tim Crowell, vice-president of the LAN group at NCNB Texas National Bank in Dallas: "Most of what we have seen is mainframe-oriented." The bank is in the midst of evaluating a variety of packages and intends to implement an EIS by year's end, Crowell added.

"What we have determined from our managers is that they only want specific pieces of information, and the mainframe-types of reports are just too large," he said. "It definitely has value to us, but the executives have only so much time for decision making, and they need to do it on a specific set of information on a system designed for them."

EIS may not be the best approach for increasing the information flow among all executives, IDC warned. Some of the factors to consider are the competitiveness of the business environment and the value placed on information as a resource.

it would not only save him considerable amounts of time, it would help him make quicker decisions.

The hotel business is bound to get tougher, especially in the nation's biggest cities where there are more hotel rooms than bodies to fill them. The demands at the front desk are probably going to be small compared with the demands in the executive offices, I said.

Not being able to type, of course, is an excuse that many executives use in an attempt to mask their fears of having to learn something new or as challenging as using information technology.

I know quite a few exceptionally fine writers who cannot imagine what life was like before word processing, yet can barely find the top row of keys on a keyboard. My friend is really no different than they are; he just doesn't know it yet.

I suspect that many information center managers know executives in their companies whose attitudes toward PCs are quite similar to those of my friend. Unfortunately, it is easier to buy into the argument that executives don't want to learn how to type as the reason for not putting PCs in top offices.

But what is apparent to me is that at companies in which end-user computing is blossoming, the push for using PCs strategically emanates from the top down. I don't think that my friend will order a PC for his office any time soon. But I think he now recognizes that the value of using a PC is not solely in being more productive but in the understanding of the technology and how it is used outside the executive offices.

Alexander is a *Computerworld* senior editor, microcomputing.

Cornering

FROM PAGE 31

Corp.'s Windows. The users can then reconfigure the menu or interface as they deem to perform market data applications such as real-time analytics.

As each broker has his own "feel" for the market, he can configure the analytics using whatever real-time or historical data he considers significant. The information that he pulls up is used to determine if and when he will perform a stock or bond transaction.

Fidelity Investments. Boston-based Fidelity Investments is now implementing a system based on the Multex approach. Using the Multex menu, a bond salesman can address historical data on both the market and the client to assure that redundant phone calls have not been made. The salesman also knows what information has been sent to that particular client. Fidelity is implementing this technique on an IBM Personal System/2.

One of the important features of the Fidelity approach is the use of Multex's IBM 3270-based terminal emulation product. Using the terminal emulation in a pop-up window, the user has direct access to information on the mainframe. This means that computing-intensive applications such as a database search are processed on the mainframe, while the remainder of the activity can be done on the PS/2.

Goldman, Sachs & Co. Goldman Sachs is also using Multex

software. Using the menu, Goldman Sachs traders can pull up different market data sources, perform analytics, read "pages" of market information and access data from in-house computers. Goldman Sachs is using this technique to replace costly dedicated terminals.

Merrill Lynch & Co. This Wall Street fixture has a variety of workstation approaches depending on the needs of specific traders. For instance, its headquar-

ing group, however, a PC system using Windows has been in place since 1987.

NASDAQ, Inc. NASDAQ traders are currently using PCs with a customized multitasking system that sits on top of MS-DOS, said Ed Flynn, assistant director of software development at NASDAQ. The organization plans to stick with the tried and true Intel architecture but will boost functionality with eventual moves to more sophisticated op-

According to Mosaad, the ideal workstation will have the ability to access different hosts, multiple data services and will need good presentation capabilities. Prudential is leaning toward the Intel Corp. architecture running OS/2 and OS/2 Presentation Manager, Mosaad said. The decision will be made in six months to a year.

New York Stock Exchange. The floor of the NYSE is a hectic and crowded place. In fact, space is at such a premium that phones have had to be repackaged and shoved into smaller containers. The same thing goes for computers.

Away from the hustle and bustle of the trading floors are customized Intel 80286 and 80386 computers locked in closets. All the trader sees is a color display or flat-panel device that provides the needed stock information, said Joel Beier, vice-president of capital markets technology at the NYSE.

Within the so-called trading booths there is even less room. Because there is hardly any space for a keyboard, touch-screen devices are the rage. These systems are tied to remote DEC VAXs.

The organization is looking at installing intelligent workstations right where the stock specialists sit but is still grappling with the space constraints. If anyone has developed a high-end microcomputer the size of a shoe box, give Joel Beier a call. Beier is working with even smaller devices. The NYSE is currently testing a handheld version of the PC.

THE IDEAL workstation will have the ability to access different hosts, multiple data services and will need good presentation capabilities.

ters staff will be using PCs with Windows that will primarily focus on finance and accounting applications, said Gordon Solars, vice-president of distributed systems.

Equity traders at the firm will most likely use high-end workstations from vendors such as IBM, Sun Microsystems, Inc. or Digital Equipment Corp. For these highly demanding applications, the hardware is chosen on an almost case-by-case basis, said Don Trojan, vice-president of equity trading systems. As a result, Trojan is looking at the most open elements possible, including Unix, ANSI's X.11 as a windowing standard, Transmission Control Protocol/Internet Protocol for networking and C as the programming language.

At the firm's municipal trad-

erating systems. Chief among the operating systems candidates are Windows, OS/2 and Microsoft and IBM's OS/2 Presentation Manager, Flynn said. The goal for high-end systems will be the OS/2 Presentation Manager, while diskless workstations tied to servers will most likely run Windows, Flynn said.

Prudential-Bache Securities, Inc. Prudential-Bache is a brokerage house in transition. It currently has a variety of trading systems but is developing a plan for a more unified future. "Today, they have all kinds of systems," said Mohammed Mosaad, senior vice-president of information systems, operations and support at Prudential-Bache. "They don't have one integrated device."

In this business,
there's one coattail
we're proud to be
riding on.



NEW PRODUCTS

Systems

Iverson Technology Corp. has announced three Tempest personal computer systems based on the IBM Personal System/2 Models 30, 50 and 60, the company said.

Two of the systems, the ITC PS 30T and the PS 50T, are reportedly approved for the federal government's Preferred Products List. The third product, the ITC PS 60T, was designed to meet the Nacsim 5100A specification.

Prices start at \$3,000 for the PS 30T, \$4,325 for the PS 50T and \$6,600 for the

PS 60T. All include a 90-day warranty.
Iverson Technology
 1356 Beverly Road
 McLean, Va. 22106
 703-749-1200

A 25-MHz Intel Corp. 80386-based portable computer is now available from Dolch Computer Systems.

The Dolch-PAC is reported to be an IBM Personal Computer AT-compatible system with 64K bytes of disk-caching and a zero-wait state microprocessor. The system incorporates six expansion slots and both serial and parallel ports. Pricing for a unit with 4M bytes of ran-

dom-access memory and a 40M-byte hard disk starts at \$9,495.

Dolch Computer Systems
 2029 O'Toole Ave.
 San Jose, Calif. 95131
 408-435-1881

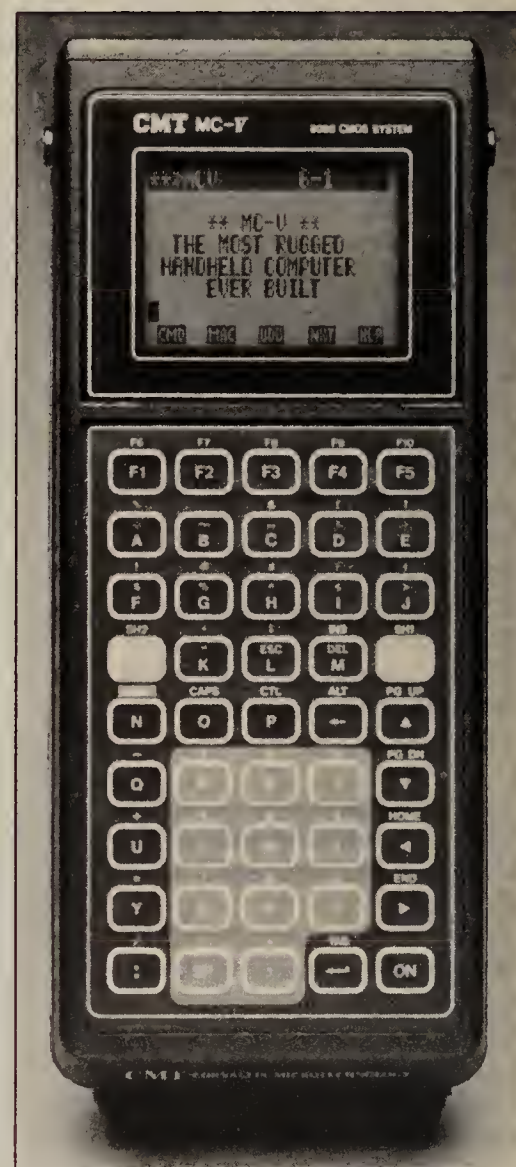
A handheld personal computer has been unveiled by Corvallis Microtechnology, Inc.

Dubbed the MC-V, the Intel Corp. 8088-based unit reportedly weighs 26 ounces and offers support for several programming languages and software platforms. The system is targeted at professionals in engineering, land surveying, forestry, medical records management and sales-route accounting.

Standard features include 256K bytes

of random-access memory, two RS-232 interfaces and an internal heater. The MC-V costs \$1,450.

Corvallis
 895 N.W. Grant Ave.
 Corvallis, Ore. 97330
 503-752-5456



Corvallis' MC-V

Epson America, Inc. has introduced the Equity IE desktop computer for business and personal applications.

According to the company, the small-footprint computer can be used stand-alone or as a network workstation. Standard features include four expansion slots, an Intel Corp. 8086 microprocessor with selectable clock speeds of 8 or 10 MHz and an IBM multiple Color Graphics Adapter interface.

The system is available in three configurations: a single 3½-in. floppy disk model priced at \$1,149, a dual 3½-in. floppy drive version priced at \$1,349 and a combination 20M-byte hard disk and 3½-in. floppy disk drive configuration priced at \$1,749.

Epson America
 23530 Hawthorne Blvd.
 Torrance, Calif. 90505
 800-922-8911

Software applications packages

Hewlett-Packard Co. has released another version of its HP Graphics Gallery software for industry-standard personal computers.

Version 3.0 reportedly provides compatibility with the computer graphics metafile format. The software package consists of two components: the HP Charting Gallery for creating presentation-quality charts, and the HP Drawing Gallery for creating and editing text, illustrations and charts.

Each package is available separately or as part of the collection. Pricing ranges from \$249 to \$499 for first-time users,



When Dial-In To Your IBM Mainframe Is In Order

Get It The Easy, Low-Cost Way With DataLynx/3174

Sales reps using portable laptop computers and TruLynx/3270 software from Local Data can dial in directly through DataLynx to the mainframe. Access databases and electronic mail. Get reports. Transfer files. And do it fast.

Watch Your Sales Go Up

Check on current orders, credit ratings and inventory status directly from customer sites. You can even enter new orders and confirm delivery on the spot. Your customers will enjoy better service... and that means increased sales.

Costs Go Down

Your sales reps' time becomes more productive. Sales Administration gets a break, too. Paperwork costs go down... not to mention

telephone expenses. Backorders are minimized. Delivery is streamlined. Inventory control gets easier. Doing business, in general, is a lot more efficient.

Forget About Accidental Disconnects

DataLynx keeps your host session active for 99 minutes... plenty of time to reconnect. Just dial back into DataLynx. Request the LU and supply the correct password. You'll be right back on line as if you'd never been disconnected.

Forgetting to disconnect isn't a problem either. DataLynx will monitor for activity on the line and break the connection when your pre-set time expires. This helps to eliminate tied-up lines and excessive telephone bills.

Support Over 100 Dial-in Users

Up to 32 PCs can dial in simultaneously for terminal emulation and file transfer. That means a 32-port DataLynx will support 100 or more dial-up users.

If that's the kind of performance you're looking for, do yourself a favor. Dial in to Local Data. You can get an on-site demo. A no-strings 30-day trial. Or just more information. Call us today at (213)320-7126. In Canada call 1-800-267-1821.



2771 Plaza Del Amo, Torrance
 CA 90503 (213) 320-7126
 TELEX 182518 FAX (213) 618-0386

Local Data products are distributed world-wide. Call for the distributor in your area. DataLynx and TruLynx are trademarks of Local Data, Inc. IBM is a registered trademark of International Business Machine Corporation. NetView is a trademark of IBM Corp.

and upgrades range from \$75 to \$125.

Hewlett-Packard
3000 Hanover St.
Palo Alto, Calif. 94304
800-752-0900

A combination hardware and software product designed to produce electronic photography on personal computers is now available from Videotex Systems, Inc.

Video Publisher reportedly consists of a 512- by 512-pixel resolution digitizing board capable of capturing analog video at 256 gray levels. Images can be saved as encapsulated Postscript, TIFF or PCX files and imported directly into virtually any desktop publishing package, according to the vendor.

The product operates on IBM Personal Computers, PC XT's and AT's and compatible computers and is priced at \$995.

Videotex
Suite 205
8499 Greenville Ave.
Dallas, Texas 75231
214-343-4500

GW Instruments, Inc. has released Version 3.0 of Parameter Manager Plus, its data acquisition spreadsheet software for Apple Computer, Inc. Macintosh computers.

The software package was developed specifically for scientists to collect, analyze and display data, according to the company, and the enhanced version provides additional data-smoothing features and larger graph sizes — up to 400 by 400 in. The product can now handle as many as 32,767 graphs from a single data set and is priced at \$990.

GW Instruments
35 Medford St.
Somerville, Mass. 02143
617-625-4096

A text editor for personal computers running MS-DOS or PC-DOS operating systems is available from Andrew M. Saucii Jr.

Called Deciwrite, the software is a single-screen text editor suitable for creating short memo notes and batch files, according to the vendor. Features include a nonblinking cursor and automatic word wrap functions. The product requires 256K bytes of memory and is priced at \$60 until April 1 and \$75 after that date.

Andrew M. Saucii Jr.
727 Barkley Ave.
E. Meadow, N.Y. 11554
516-538-9209

Distribupro, the maker of Accounting by Design, has announced a price increase for its Client Write-Up software introduced last April.

The general ledger package for professional accountants originally carried a price of \$995. Version 2.0 of the product now costs \$1,295, according to the vendor.

Distribupro
2034 Bearing Dr.
San Jose, Calif. 95131
408-436-7499

A C language programmer's tool kit has been introduced by Effective Data Solutions.

Zipwhere reportedly maintains a data file of U.S. ZIP codes and related geographic information, including city, state and county names and area code information. It requires less than 1M byte of storage and runs on IBM Personal Computers and compatibles.

Zipwhere costs \$139.
Effective Data Solutions
Suite 102
28225 Agoura Road
Agoura Hills, Calif. 91301
800-777-8818

Software utilities

A DOS driver that was designed to double the capacity of both hard and floppy disks has been introduced by Sundog Software Corp.

Called Squish Plus, the logical device driver is said by the company to be completely transparent and can compress files of up to 512M bytes.

The product runs on stand-alone IBM Personal Computers as well as compatible workstations and can operate with 3Com Corp. or IBM PC Network file servers.

Squish Plus costs \$99.95 and requires 36K bytes of random-access memory.

Sundog Software
264 Court St.
Brooklyn, N.Y. 11231
718-855-9141



United Software Security's PC Librarian

United Software Security, Inc. has announced the release of an archiving utility for IBM Personal Computers, Personal System/2s and compatibles.

The program, which is called PC Librarian, is designed to remove inactive files from the PC while retaining a catalog of information pertaining to the removed files on the hard disk, the company said.

The software requires a minimum of 512K bytes of internal memory and is priced at \$99, according to the company.

United Software Security
8133 Leesburg Pike
Vienna, Va. 22180
703-556-0007

A software package that allows personal computer users to program their computers to automatically perform routine tasks is now available from Complementary Solutions, Inc.

Called Automate, the product reportedly performs file backup, report printing and batch job scheduling automatically and according to a predetermined schedule. Operator intervention is not required. The software is priced from \$200 to \$250.

Complementary Solutions
Suite 202
4470 Chamblee-Dunwoody Road
Atlanta, Ga. 30338
404-454-8033

Microsoft Corp. is currently offering Docucomp, a document comparison program from Advanced Software, Inc., free of charge to Microsoft Word 4.0 users.

Docucomp uses pattern recognition technology to compare two versions of a document and report any changes, according to Advanced Software. It is available for other word processors in both networked and single-user versions and is priced at \$159.95 plus shipping and handling.

Advanced Software
Suite 212
1095 E. Duane Ave.
Sunnyvale, Calif. 94086
800-346-5392

Macintosh products

Xerox Imaging Systems has announced a text-scanning software package that provides intelligent character recognition (ICR) for Apple Computer, Inc. Macintosh-compatible scanners.

Datacopy Accutext utilizes ICR technology to capture virtually any typeface in complex document structures, complete with word-processing commands, according to the vendor. It reportedly boosts the accuracy of desktop scanning systems available for the Macintosh II and the Macintosh SE with a Motorola, Inc. 68020 accelerator card.

The software requires 4M bytes of system memory and is priced at \$995.

XIS
1215 Terra Bella Ave.
Mountain View, Calif.
94043
415-965-7900

Introducing IPL's AS/400™ memory card.

You can't get much faster than IPL Systems. Almost as soon as IBM announced the AS/400™ we had a low-cost alternative for expanding AS/400™ memory. Available immediately.

But don't be surprised that we were one of the first companies to offer better-priced products for the AS/400™. We've been designing IBM-compatible equipment for over fifteen years, so we've become experts at nipping at IBM's heels.

And of course, we still offer an unlimited lifetime replacement warranty on all of our memory products, an assurance that's infinitely longer than IBM's 1 year warranty. So contact us today for more information about the 5500 Series Memory Cards.

And the next time IBM gets out its hat and cane for a product announcement, remember that IPL is looking right over their shoulder.

IBM and AS/400 are registered trademarks of International Business Machines Corporation

ipl systems, inc.

360 Second Avenue Waltham, MA 02154 1-800-338-8ipl In MA (617)-890-6620



Not just another power trip.

The IBM PS/2 Model 70 386 with Micro Channel.

A desktop system with 386 power, loaded with memory, racing through complex applications at up to 25 MHz, is where the Personal System/2® Model 70 386 *begins*.

What it offers you beyond its sheer power, is where it begins to make a difference.

Model 70 386			
Available models	A21	121	E61
Microprocessor	80386 25 MHz, 64Kb memory cache (30ns)	80386 20 MHz	80386 16 MHz
Optional Math Co-Processor	80387 25 MHz	80387 20 MHz	80387 16 MHz
Memory (RAM)			
Standard	2Mb (80ns)	2Mb (85ns)	1Mb (100ns)
Maximum on system board	8Mb	6Mb	6Mb
System maximum	16Mb	16Mb	16Mb
Diskette storage	1.44Mb 3.5-inch standard (2 maximum)		
Fixed disk storage	120Mb (23ms)	120Mb (23ms)	60Mb (27ms)
Built-in features	Video Graphics Array (VGA) and display port; diskette controller; serial, parallel, keyboard and pointing device ports; clock/calendar.		
System expansion	Three option slots (two 32-bit, one 16-bit).		
Operating systems	DOS 3.3, 4.0, IBM OS/2, AIX™ PS/2.		

The Model 70 386 features Micro Channel,™ a 32-bit bus created to take full advantage of 386 technology. Micro Channel is designed for multitasking and multiprocessing. It allows the PS/2® to operate several intelligent processors and subsystems simultaneously. So you can do several jobs at once and still get truly balanced performance.

With the Model 70 386, complex spreadsheets go faster than ever. So do sophisticated graphics. Even networking is no sweat. And Micro Channel ensures a platform for future applications, such as imaging and advanced communications.

By combining Very Large-Scale Integration, advanced Surface Mount Technology and built-in features, PS/2s deliver state-of-the-art reliability and design sophistication. The Model 70 386 runs most current DOS applications and is ideal for the new OS/2™ applications.

Here, then, is a system that recognizes your need for power today, and helps protect your investment for years into the future. All at a price you'd expect to pay for 386 machines with "yesterday's" bus architecture.

For a demonstration of the PS/2 Model 70 386, see your nearest IBM Authorized Dealer or IBM marketing representative. Call 1 800 IBM-2468, ext. 119 for a dealer near you.

It'll be well worth the trip.



IBM
Personal System/2 and PS/2 are registered trademarks of IBM Corporation. OS/2, Micro Channel and AIX are trademarks of IBM Corporation. © IBM Corp. 1989.

A voice-recognition system developed specifically for use with the Apple Computer, Inc. Macintosh has been announced by Articulate Systems, Inc.

Dubbed the Voice Navigator, the combination hardware and software product includes a built-in microphone, speaker and sound controls and responds to the user's voice in the same manner as a keyboard responds to touch, the vendor said. The system reportedly connects to the computer via the small computer systems interface port.

The Voice Navigator is set to ship in the second quarter and is priced at \$999.

Articulate Systems

99 Erie St.

Cambridge, Mass. 02139

617-876-5236

A video card for the Apple Computer, Inc. Macintosh SE has been introduced by Mobius Technologies, Inc.

Called Multiscreen, the product reportedly allows users to attach a variety of full-size monitors to the Mac SE system. It consists of a video board and software for multiple resolution display and is priced at \$495.

Mobius Technologies

6020 Adeline St.

Oakland, Calif. 94608

415-654-0556

A 21-in. monitor developed for use with the Apple Computer, Inc. Macintosh II is now available from Moniterm Corp.

The Viking 21 provides a square, flat screen designed to provide a larger display area and reduce glare pickup from overhead or peripheral light sources, the vendor said. The product displays 256 colors out of a palette of 16.8 million, weighs 78 pounds and costs \$3,795.

Moniterm

5740 Green Circle Drive

Minnetonka, Minn. 55343

612-935-4151

Peripherals

In Focus Systems, Inc. has announced a line of PC Viewers designed to add high-contrast black-and-white projected images to the company's current blue and yellow display products.

The viewers reportedly allow presentations developed on a personal computer

to be magnified and displayed directly on an overhead projector, eliminating the need for traditional overhead foils.

Reportedly compatible with IBM Personal Computers and Personal System/2s as well as Apple Computer, Inc. Macintosh and Apple II machines, the PC Viewer line has a price ranging from \$895 to \$2,995.

In Focus Systems

7649 S.W. Mohawk St.

Tualatin, Ore. 97062

503-692-4968

An 8-bit, gray-scale, flatbed scanner has been introduced by Hewlett-Packard Co.

The HP Scanjet Plus is available with either an IBM Personal Computer- or Apple Computer, Inc. Macintosh-compatible interface kit and provides 256 levels of gray, according to the vendor. An optional 20-page sheet feeder is available. The scanner costs \$2,190.

HP

3000 Hanover St.

Palo Alto, Calif. 94304

800-752-0900

Pacific Data Products has announced a Hewlett-Packard Co.-Graphics Language (HP-GL) emulation cartridge for laser printers.

According to the company, the product offers a complete emulation of HP's 7475A plotter and implements HP-GL on an HP Laserjet Series II printer. The cartridge reportedly provides print-spooling capacity to 2M bytes and is priced at \$395.

Pacific Data

6404 Nancy Ridge Road

San Diego, Calif. 92121

619-552-0880

Board-level devices

A scanner and laser-printer controller has been introduced by Advanced Vision Research, Inc.

The Tiger-EMS board was designed for office publishing applications, the company said, and runs on Intel Corp. 80386-based machines as well as IBM Personal Computer, PC XT and AT and compatible systems.

The board comes with 2M bytes of random-access memory, expandable to 8M bytes, with a daughterboard option. The single-slot card includes memory-management software and supports several hardware platforms.

The interface board, with 2M bytes of RAM and software, is priced at \$1,795.

Advanced Vision Research

2201 Qume Drive

San Jose, Calif. 95131

408-434-1115

Capital Equipment Corp. has introduced a multifunction board designed for use with IBM's Micro Channel Architecture.

The OS/RAM8 provides up to 8M bytes of memory and two serial ports and automatically configures itself for DOS or OS/2, the vendor said. Micro Channel installation can reportedly be accomplished with four keystrokes, and no configuration changes are required when changing operating systems.

The board is priced at \$449 and includes a two-year warranty on parts and labor.

Capital Equipment

No. 107, 99 S. Bedford St.

Burlington, Mass. 01803

617-273-1818

SEVENTY BILLION LINES OF COBOL ARE A TERRIBLE THING TO WASTE.

COBOL systems dominate the world's business, with more than 70 billion lines of code. And a million experienced programmers. So why change languages when you develop for the personal computer? Why add a small step called "rewrite the whole system" to each development project? The effect on budget, schedules, standards and staff is painful—and unnecessary.

Realia offers full PC emulations of the tools you know: Realia COBOL, RealCICS, RealDL/I. With no conversion and no retraining, you can move big existing systems to the PC for development, then upload them to the mainframe—or leave them on the PC—for production.

With Realia, COBOL becomes for the PC what it has always been for the mainframe: powerful, flexible, and above all maintainable. Realia's compiler generates highly optimized machine code, with speed and compactness unmatched among PC COBOLs. You get the performance levels of Pascal or C, without the cryptic operators and the learning curve.

Realia also ends your frustration with mainframe programming utilities. Ours are fast, intuitive, full-screen and full-color. From screen manager to BMS map editor to source-level debugger, these tools eclipse anything available on the mainframe.

See for yourself. Call for a *free* 30-day evaluation.

REALIA®

10 South Riverside Plaza, Chicago, IL 60606, 312/346-0642
34 North End Road, Hammersmith, London W14 0SH, England, 01/602-8066
1284 Wellington Street, Ottawa ONT K1Y 3A9, Canada, 613/725-9212

If you're in the market
for a UNIX[®] workstation,
we're the company
you should be
talking to.



\$5490

\$6490

\$9400

DN3000 with 15" 1024 x 800 monochrome display

DN3000 with 19" 1280 x 1024 monochrome display

DN3000 with 15" 1024 x 800 color display



\$8490

\$9490

\$9990

*DN3500 MC68030-based workstation with
15" 1024 x 800 monochrome display*

*DN3500 MC68030-based workstation with
19" 1280 x 1024 monochrome display*

*DN3000 with 15" 1024 x 800 monochrome display
and a 155MB ESDI display*

We can talk price.

We'd like to begin this conversation by making six points. Price points, that is.

Because within our family of UNIX® workstations are six machines whose prices are as low as their technology is high.

Take for example, our family of personal workstations. Machines that offer superior networking ability and even MC68030 performance for less than \$10,000.

Prices that become even more impressive when you realize they include 4MB of memory, a floating point coprocessor, an IBM PC AT®-compatible bus, and a choice of Ethernet®, Apollo® token ring, or IBM token ring networks.

So when you're ready to talk price, ask us about our Series 3000™ and Series 3500™. Or better yet, just let the numbers speak for themselves.

apollo



We can talk performance.

Price isn't the only attribute of our workstations that speaks for itself.

Recent tests pitting the Apollo Series 10000™ against workstations, minis, superminis and mainframes declared the 10000 an undeniable victor. Expertly running complex applications up to seven times faster than its challengers.

Such an outcome could hardly be achieved by conventional means. Instead, the Series 10000 required an entirely new architecture, making it the only office-sized UNIX® server and workstation to yield true supercomputer performance.

With up to four CPUs, the 10000's *PRISM*™ architecture delivers performance 100 times that of a VAX® 11/780. Yet costs as little as \$6500/MFLOP, one-tenth that of the competition.

All of which suggests that if extraordinary performance is what you're after, the Series 10000 from Apollo will leave you speechless.

apollo

Unisys Wang IBM
Hewlett Packard
Cray Honeywell
Compaq Digital
Nixdorf Siemens
AT&T Apple Sun

And we can talk to any computer you'd ever want to talk to.

The only story bigger than our performance capabilities is our open computing environment. As a founding member of the Open Software Foundation, Apollo is committed to providing a broad range of computing alternatives.

Today every Apollo workstation can communicate over OSI, DECnet,[®] Ethernet or IBM token ring networks and accept VME-, SCSI- or PC AT-compatible equipment. Our support for UNIX[®] (Berkeley 4.3 and System V.3 SVID compliant), MS-DOS[™] and X Window System[™] assures that your application software is truly portable. And our adherence to standards such as PHIGS and GKS stream-lines graphics-intensive applications.

What's more, Apollo's de facto industry standard for distributed computing, the Network Computing System,[™] allows users to share data and computing power in a single integrated environment. Resulting in a new way of computing that's both more elegant and more efficient than any other.

Give us a call soon. You'll find that our actions speak even louder than words.

apollo

For more information, call 1-800-323-1846 (Massachusetts, 1-800-847-1011) or write Apollo Computer, 330 Billerica Road, Chelmsford, MA 01824.

Apollo is a registered trademark and Personal Workstation, Series 3000, Series 3500, Series 10000, *PRISM*, and Network Computing System are trademarks of Apollo Computer Inc. UNIX is a registered trademark of AT&T. AT is a registered trademark of International Business Machines Corp. Ethernet is a registered trademark of Xerox Corporation. VAX and DECnet are registered trademarks of Digital Equipment Corporation. MS-DOS is a trademark of Microsoft Corporation. X Window System is a trademark of MIT.

DATA STREAM

Thomas L. Nolle

Life beyond AT&T



Second of a two-part series. Last week's column introduced independent "regional" carriers that

are extending their geographic reach to challenge dominant interexchange carriers with lower prices and advanced service offerings. However, the reality of dealing with such companies introduces some potential snags.

Network management is one potential trouble area — particularly as regional carriers band together in consortiums. Once they have linked their respective networks, the problem of finger-pointing rears its head.

However, carrier management techniques are strong enough to allow most users to employ any major regional carrier without significant risk.

For example, National Telecommunications Network, a consortium of five regional carriers, maintains a separate network operations center from which it can oversee the high-level trunk activity in a multi-region network. If a problem is identified, the group's center

Continued on page 57

Tariff 12 considered

AT&T's custom net service not for everyone

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — AT&T's Tariff 12 custom network service provides network managers with a host of new opportunities, but it can also leave them with new decisions to make about how much control they want over their corporate networks.

For example, Tariff 12 contracts put responsibility for network equipment, maintenance, repair and technology upgrades in the hands of AT&T, according to speakers at the Communication Networks '89 conference earlier this month.

Berge Ayvazian, vice-president of Boston-based research

and consulting firm The Yankee Group, said this means managers can reduce in-house staff and count on automatic upgrades, but it also means a loss of control when something breaks down.

Trade-off

In addition, the volume discounts in Tariff 12 contracts discourage users from splitting their network traffic between two long-haul carriers. The trade-off for the low price is the vulnerability of depending on a single carrier, Ayvazian said.

Tariff 12 is a regulatory umbrella that covers custom-network contracts negotiated with individual customers such as Du Pont Co. and Ford Motor Co. The contracts provide a package

AT&T signs corporate elite

Some of the largest U.S. companies are building custom AT&T networks under Tariff 12

Customer	Contract	Effective date
Defense Department	Defense Commercial Telecommunications Network	Oct. 1, 1985
General Electric	Digital Tandem Switched Network	Aug. 20, 1987
Du Pont	VTNS* Option I	Feb. 10, 1988
Ford	VTNS Option II	April 29, 1988
American Express	VTNS Option III	Oct. 31, 1988
American Airlines	VTNS Option IV	Jan. 30, 1989

* Virtual Telecommunications Network Service

SOURCE: THE YANKEE GROUP
CW CHART: JOHN YORK

of voice and data transmission, network management and associated equipment and services.

The contracts allow customers to pay for tariffed network services rather than purchasing equipment, thus complementing AT&T's effort to migrate net-

work switching and intelligence from customer premises back onto the AT&T network, Ayvazian explained.

"This strategy also addresses the growing interest of telecommunications users in leasing

Continued on page 55

E-mail services bow to X.400 pressure

BY ROBERT MORAN
CW STAFF

As users increasingly demand common links between different electronic mail systems, communications service companies are moving — however reluctantly — to support the CCITT X.400 standard.

Already widely supported in Europe, the X.400 protocol is finally catching on in the U.S.

Large corporations and the U.S. government want to link their private E-mail systems to public systems, spawning a call for a national E-mail network. Major vendors have already provided X.400 support on the private side; now it is up to vendors such as Telenet Communications Corp. and Western Union Corp. to provide X.400 support on their public E-mail services.

Large customers want one

system that can connect them to members within their organizations but also to their suppliers and customers. According to Richard Miller, president of Rapoport Communications, Inc. in Palo Alto, Calif., large business users are turning to X.400 because it can bear much more than the interpersonal messages typically found on E-mail systems.

One of the business applications for X.400 is to work as a complement to electronic data interchange (EDI). The growing throng of businesses that use EDI to exchange documents electronically with business partners are increasingly de-

manding X.400 as a standardized E-mail system to deliver such documents. Standards bodies are already working on ways to integrate EDI with X.400.

In addition to the nudge from large corporations, two powerful bodies have used their might to bring the services companies closer to X.400. The Aerospace Industry Association (AIA) challenged vendors that tout X.400 last December to provide interconnection or lose their business. The association, Miller said, wants to subscribe to one vendor and communicate with the party of its choice, which may be using a different E-mail

Continued on page 57

Studies help uncover ISDN markets

BY ELISABETH HORWITT
CW STAFF

MORRISTOWN, N.J. — For the last two years, AT&T has conducted a series of Trivista studies to determine how ISDN and other enhanced services can meet the communications needs of customers in various industry segments.

The 20 detailed studies conducted so far have generated Integrated Services Digital Network customers for AT&T and the former Bell operating companies in almost every case, according to AT&T Network Systems Division spokesman Michael Vogel. The results, packaged into marketing pamphlets, have become part of AT&T's campaign to convince prospective users that "ISDN is here now." But they also offer clear snap-

shots of how different types of organizations are gaining real cost and productivity benefits from the technology.

Trivista is a three-way partnership, consisting of AT&T's Network Systems subsidiary, "which knows the technology and products;" local telephone companies, "which provide the services;" and end users, "who know day-to-day business needs and can help us understand how to customize" the network to meet them, Vogel said.

The team inventories the customer's networking installation and then conducts a study that "envisions what the introduction of ISDN would mean in terms of productivity and cost," Network Systems spokeswoman Ellen Bond said.

Market segments covered so far include insurance, health

care, manufacturing, banking, education, hotels and motels and government.

The first study subject — Tenneco, Inc. — has become a full ISDN user, with approximately 3,000 lines on Southwestern Bell Corp.'s ISDN Centrex service [CW, Jan. 30]. Among the other study subjects, which did not want their names disclosed, were the following:

- An insurance company developed the idea to install ISDN links to provide independent agents with the ability to access the latest product information over ordinary telephone lines. The application is designed to help the company gain a firmer hold on its better agents and make sure all agents are up-to-date and well trained, Vogel said.
- A hospital concluded that ISDN would be useful for elimi-

nating the expense of modems, incompatible local-area networks and private lines as a way to connect different departments in a city complex. The hospital is also considering implementing its own version of the insurance company application described above, which it learned about from AT&T. Doctors who use the hospital as a consulting hospital would tie into the organization's data and applications via ISDN lines.

• A hotel chain is looking at an application that would let customers check in at the airport but still have eye-to-eye contact with the hotel clerk through a compressed video signal sent over a 64K bit/sec. ISDN link.

Originally, Trivista aimed at finding applications for a variety of enhanced features and services that could be made available on the central office equipment that AT&T Network Systems sells, Vogel said.

"A lot of the enhanced service capabilities that ISDN brings will reside in the public network, in the central office. But there are also pre-ISDN enhanced services that provide customers with more control of the Centrex offering. It's rather difficult to get customers to upgrade a basic Centrex service to the tune of 20% to 50% [cost increase] unless you can truly see some value that's very direct," he said.

The initial idea was not to generate requests for proposals but simply to "document on an industry-by-industry basis what critical needs can be best or uniquely addressed by the services and to quantify those benefits to the end user and telephone company," Vogel said. The studies have "put into black-and-white what it costs a telco to implement ISDN for a specific user and how that might translate into a tariff," he said.

“Know how much it costs to add highly trained people to your data networking staff? Nothing.”

—Joe Frizzell, Manager
AT&T Data Maintenance Operation and Control Center
Dallas, Texas

“You can never have enough people overseeing your company’s data transmission. That’s the theory behind AT&T Data MOCCs (Data Maintenance Operation and Control Centers). Think of it as instantly having an additional staff of highly trained, experienced technicians working to back up your entire DATAPHONE® II network.

Our network and our data communications equipment are designed to work together in perfect harmony—a combination of quality and accuracy unmatched in the business.



From planning to installation, to remote network monitoring and troubleshooting, we're always there. Data MOCC technicians work with you on a regular basis tracking down problems, arranging for repair, giving you total end-to-end support to help you keep your network performing flawlessly day after day.

And the cost? If you lease or rent AT&T data communications equipment, or own it with our valid service contract, adding Data MOCC won't cost you a single penny extra. Not a bad deal, right? And it's the kind of

service you couldn't buy from another vendor at any price. Because only AT&T offers it.

The highest quality products and the highest commitment to supporting them. If you think Data MOCC looks like a pretty good deal, you're right. And just think of how good you'll look for using it."

To find out how much more you get with AT&T DATAPHONE II data communications equipment, see your AT&T Account Executive, your authorized AT&T Reseller, or call 1 800 247-1212, ext. 717.



AT&T

The right choice.

IS THIS WHERE YOUR INFORMATION SYSTEMS ARE HEADING?



The scrapheap doesn't have to be the end of the line for all those expensive IBM and ASCII terminals. Because Gandalf has a way to transform their apparent obsolescence into new-found productivity.

It's called StarPort, an option of Gandalf's unique STARMASTER™ Hybrid Networking System. StarPort turns any desktop terminal into a powerful PC, providing access to MS-DOS software from

anywhere in your network. StarPort can connect desktops to virtually every computing resource in your network, centralize control of productivity application software and permit access to data only as needed. And because StarPort is menu-driven, it's extremely easy-to-use. But best of all, you'll discover StarPort to be very cost effective, in both short-term applications and future system expansion.

Find out more about Gandalf's StarPort and STARMASTER systems by calling the office nearest you. And keep your current equipment headed in a productive direction, rather than to the scrapheap.

gandalf
Productivity
Through
Connectivity

BIT BLAST

Banks' role in EDI disputed

Attendees at the recently held **EDI and Financial Institutions Symposium** debated the role banks should play in providing electronic data interchange (EDI) services. While many attendees said they are counting on the banks to provide these services, spokesmen from **Procter & Gamble Co.** and **General Electric Co.** stated that major corporations will deal directly with one another for most EDI transactions, turning to banks only for EDI payment services.

In response to **AT&T's** recent 3.8% rate decrease, Vienna, Va.-based **Cable & Wireless Communications, Inc.** said it has also reduced rates for its long-distance and call accounting services and completed a major restructuring of its equal-access WATS service. Rates for interstate switched and dedicated access services have dropped an average of 5%. Fees for its call accounting and security features were reduced an average of 28%. The restructured WATS service reportedly will provide 5% savings.

Data General Corp. has joined the **OSI/Network Management Forum**, a vendor organization dedicated to ensuring interoperability of different vendors' network management products through the use of Open Systems Interconnect protocols.

National Advanced Systems, Inc. (NAS) extended its scientific/engineering strategy recently by announcing an IBM-to-Digital Equipment Corp. VAX connectivity link. NAS, which often installs IBM-compatible machines at DEC sites, has agreed to co-market a high-speed network controller product made by **Interlink Computer Sciences, Inc.**

An electronic mail system for the hearing-impaired has been co-developed by **Galaudet College** and **Metrocast**. It is said to send full-text messages either by Telecommunications Device for the Deaf or ordinary telephone to a portable pock-

et-size receiver that vibrates to alert the recipient that a message is waiting.

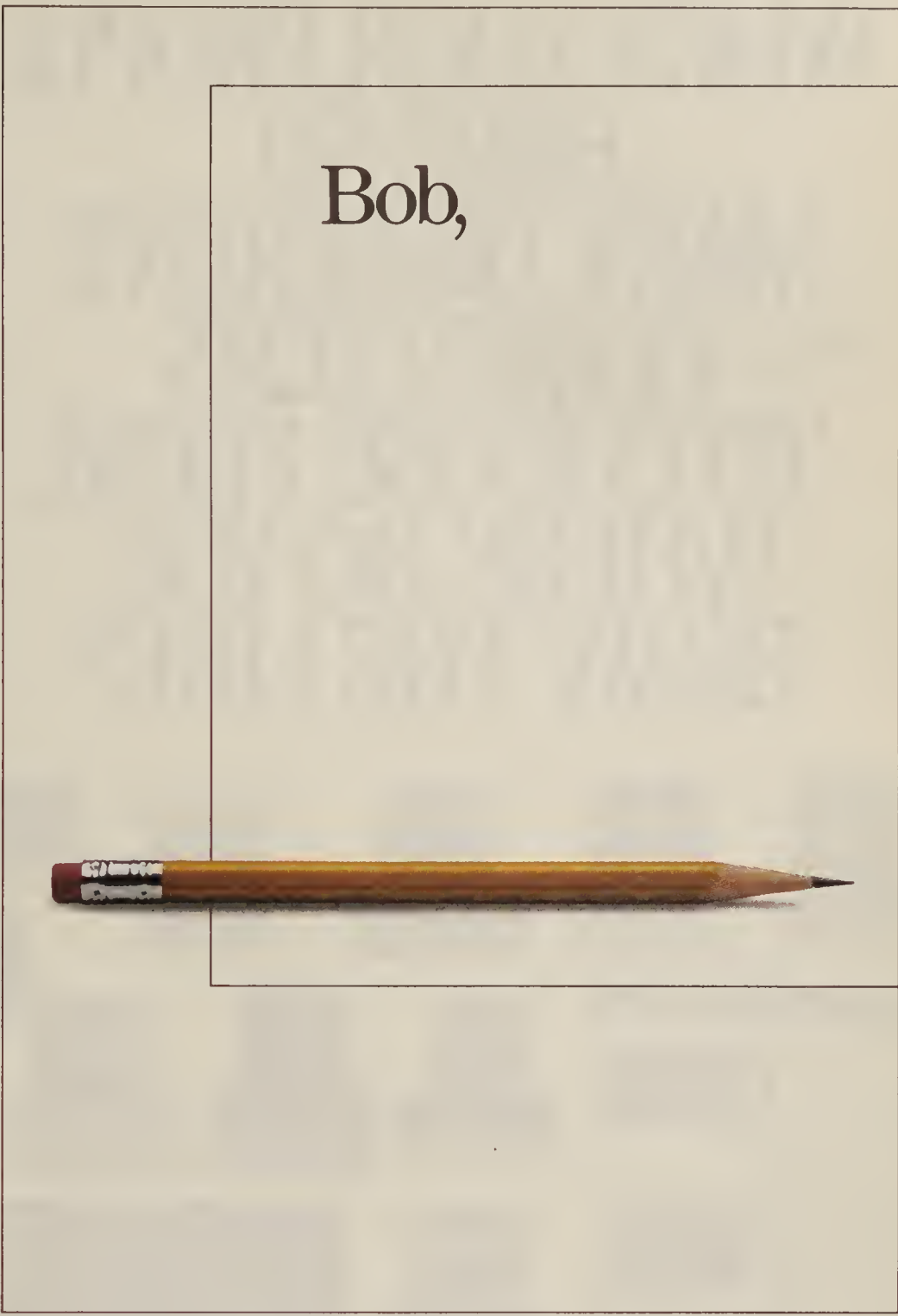
Cayman National Bank and Trust Co., the only locally owned bank in worldwide financial center the Cayman Islands, has implemented a signature scanning, storage and display system using a hand scanner from **Cameron GMBH** in West Germany and a customized mouse-driven software program that runs on three **NCR Corp.** microcomputers compatible with the IBM Personal Computer XT. The personal computers use NCR's Towneret to access digitized signatures stored in an NCR Tower 600 hard disk.

IBM Information Network, which had served the U.S., Canada and Europe, will now provide E-mail and EDI services between the U.S. and Japan via IBM Systems Network Architecture links.

Four companies have successfully completed protocol verification procedures to integrate their applications with Integrated Business Exchange, a private branch exchange system from **Wang Laboratories, Inc.** subsidiary **Intecom, Inc.** The vendors are **Amcom Software, Inc.**, **Compco, Inc.**, **Digital Techniques, Inc.** and **Startel Corp.**

As part of a recently launched campaign to modernize and rewire its telecommunications network, China is installing **AT&T 5ESS** digital switches in many major cities. One of the 5ESS switches, handling 12,160 lines, was installed to handle data and voice communications for the Ministry of Railways in Beijing.

The Canadian Imperial Bank of Commerce in Toronto will become the first commercial user of Bytex Corp.'s Unity system, which is said to provide local- and wide-area switching and network management capabilities. The \$1 million-plus contract calls for two Unity 50 systems to be installed in two of the bank's data centers, Bytex said.



Simpact Associates, Inc. and **Systems Strategies, Inc.** (SSI) have announced a marketing and distribution agreement to develop and market a turnkey DEC-to-IBM system that combines SSI's VAX Link/SNA software family with Simpact's hardware platform. The product reportedly will support 3270,

RJE and, eventually, LU6.2-based links between DEC and IBM hosts.

Contel ASC has boosted its capacity to provide very small-aperture terminal satellite services by installing a fourth shared hub at the New York Teleport in Staten Island, N.Y.

Tariff 12

CONTINUED FROM PAGE 51

rather than owning their entire network," he said.

"Tariff 12 provides the customer with the conveniences of one-stop shopping, a single point of responsibility and an end-to-end solution," he continued. Moreover, Tariff 12 users tend to get new features such as bandwidth management systems before they are widely available, he said.

AT&T's goal, Ayvazian said, is to create a close partnership with the top 200 national accounts and gain a competitive advantage in its head-to-head competition with MCI Communications Corp. and U.S. Sprint Communications Co.

Of course, MCI and U.S. Sprint are not sitting still. MCI recently signed contracts for custom-designed private networks with United Airlines, Procter & Gamble Co. and Dun & Bradstreet Corp., while U.S. Sprint has new contracts with Westinghouse Electric Corp., North American Phillips and the U.S. General Services Administration.

American Airlines is the most recent company to sign up with AT&T under a Tariff 12 contract, effective Jan. 30. As in previous Tariff 12 contracts, the customer will pay a flat monthly fee and measured charges based on rate periods and mileages. The contract will last for five years and will offer a 10% discount during any month in which usage charges in certain locations exceed \$30,000.

David Nall, a Washington, D.C., attorney, said that network managers should be wary of several pitfalls with Tariff 12 contracts:

- You lose control over your private network because AT&T determines what facilities will be used.
- Managers of data networks may find themselves "playing second fiddle to the voice people" in cases in which voice traf-

fic makes up 90% of the network volume and thus generates most of the price discounts.

- The contracts lock customers into AT&T service for three to five years, "and you're going to have some heavy liability if you try to get out of that too quickly."

Customers also should be aware of the regulatory uncertainty surrounding the controversial Tariff 12, which the Federal Communications Commission allowed to take effect pending an investigation. It is not clear what will happen to existing networks if the FCC, or a court, rules Tariff 12 unlawful.

The FCC is currently investigating charges by MCI, U.S. Sprint and others that Tariff 12 is illegal because the custom networks do not qualify as generally available common-carrier services and the special discounts could amount to predatory pricing.

John R. Hoffman, senior vice-president at U.S. Sprint, said he is concerned that "as more time passes, it is going to become more difficult to unscramble the egg if Tariff 12 is ultimately found to be unlawful."

Legal questions

John Cimko, chief of the Federal Communications Commission's Tariff Division, said the FCC will decide the legality of AT&T's Tariff 12 based on four standards:

- Are the rates too low, and are the discounts financed by other ratepayers via cross-subsidies?
- Is Tariff 12 a set of customized packages that are not generally available common-carrier services, or are they — as AT&T argues — merely a set of discrete components that are available to all customers in different arrangements?
- Can the Tariff 12 services be resold?
- Are AT&T's Tariff 12 services excessively bundled?

MITCH BETTS

WHEN YOUR PEOPLE
HAVE SO
MANY DIFFERENT
COMPUTERS
TO CHOOSE FROM,
WHERE DO YOU
DRAW THE LINE?



© 1994 3Com Corporation. All trade names referenced are the service mark, trademark, or registered trademarks of the respective manufacturers. 3Com is a registered trademark of 3Com Corporation.

Nolle

CONTINUED FROM PAGE 51

hands it off to a regional center, whose own network management system can usually test circuits through the local exchange right to the customer's interface.

This is not to say that regional service is for everyone. Most of the regional carriers have purchased fiber right-of-way and tend to locate their switching and connection points — points of presence, or POPs — along their routes. Thus, while an Amarillo, Texas, data center manager may be able to lease digital service from a regional carrier easily, someone in Pierre, S.D., may have no regional carrier at all.

Even where there is a POP in the area, the user may find that the distance between the regional POP and the target termination for the service is so great that local access charges exceed the long-haul cost.

Like all telephone circuits, a regional-based circuit has several cost components. The interexchange charge set by the regional carrier moves the information between the POPs closest to the subscriber's endpoints. Local exchange costs are assessed to link that endpoint to the carrier POP. Both these costs typically include a one-time installation charge and a monthly recurring charge. Carriers may also bill for service coordination if they want the regional carrier to set up the local access line for them.

It is important to understand the charge basis when dealing with a regional carrier, but it is also important to understand the difference between these carriers and some of the larger and more regulated interexchange carriers.

AT&T, MCI and Sprint all have pub-

lished tariffs for interexchange service. Other carriers such as ITT also file government tariffs, available from the Federal Communications Commission and the carrier, that provide not only service rates and other charges but will also indicate discount schedules and terms. Regional carriers are rarely required to file formal rate schedules and thus rarely have them available for review.

Getting a copy of an interexchange carrier tariff helps set a baseline against which regional rates can be measured. Pricing varies widely with the duration of the contract and the total dollar volume of business or circuit miles involved. A cross-country T1 route may be priced at more than \$40,000 per month on a month-to-month basis from one carrier and at \$24,000 per month on a one-year term from another.

Quality is always a concern of network users and particularly so when "name-brand" carriers are not used. Most regional carriers will guarantee error performance at levels similar to and sometimes better than the large interexchange carriers. Many have all-fiber networks or are exclusively fiber on most major city-pair connections, so they are not fearful about writing quality commitments and service credit terms into an agreement.

For users lucky enough to be located near a regional carrier's POP, the service and cost benefits may be very significant. Major firms have reported savings of 40% over the best terms negotiable from the major carriers. In these times of financial pressure, a regional carrier can often mend a broken budget.

Nolle is president of CIMI Corp., a communications consulting company based in Haddonfield, N.J.

I think we've got a problem with the printers in accounting.



E-mail services

CONTINUED FROM PAGE 51

service vendor.

Adding more force is the Government Open Systems Interconnect Profile, or GOSIP, a federal information processing standard established last August that mandates that governmental agencies procuring data communications services adhere to the International Standards Organization's Open Systems Interconnect, which includes X.400 messaging.

Until now, most analysts contended, service vendors have responded to customer demand for X.400 by providing X.400 gateways to computer-based E-mail systems and promising to connect to competitors later.

"The service vendors have been playing a waiting game as far as providing X.400," Miller added.

But this appears to be changing. Telenet, AT&T, MCI Communications Corp., Dialcom, Inc., GE Information Services, GTE Communication Systems, McDonnell Douglas Corp. and Western Union Corp. made commitments to participate in the AIA pilot project. IBM Information Network, which is preparing to offer service interconnection, has yet to commit to the pilot. Western Union has committed to an X.400 interconnection with GE Quickcom and McDonnell Douglas Ontyme, but the company does not offer X.400 services.

According to Marni Erlich, district manager of electronic messaging systems

and office automation at AT&T, the company is testing an X.400 connection between AT&T Mail and an undisclosed service in addition to its connection with Dialcom, announced in January. Western Union, according to Vice-President of Marketing Brian Gaylord, has been testing X.400 with a few U.S. customers and European administrations. Telenet also has set up international X.400 connections, a company spokeswoman said.

Sign of life

One sign of the healthy demand for X.400 is the fact that many vendors are working on the next generation of X.400 gateways, at least partly because the current products cannot efficiently handle growing traffic demands, Miller said.

However, both national and international X.400 networks are still missing one critical element for success: directories. From electronic analogs to the telephone company's white pages, directory services would allow users on different vendors' E-mail services to exchange mail automatically — without first having to call a recipient to find out his or her mailbox address, log-on name and so on.

But directories currently do not offer the necessary universal accessibility, which will be provided by the latest version of the X.500 directory standard. Now that X.400 specifications are in place, vendors are expected to move more quickly from the 1984 version of X.500 to the 1988 version.

According to Miller, the vendors plan to offer X.500 directories in conjunction

with their next X.400 offerings. Telenet said it plans to announce an X.500 directory in the fourth quarter.

Another thorny issue that has bogged down X.400 service introductions is allocation of charges when two or more E-mail services are involved in a user exchange. Service vendors have been meeting with European communications carriers and value-added network suppliers in the International ADMD operators group to establish what must be mea-

sured and what is chargeable.

According to Miller, service providers already interconnected have brought their experience and influence to play at the committees. Walter Ulrich, a partner at Coopers & Lybrand's Management Consulting Services Division, added that corporations are already conditioned to paying premiums for telecommunications links that involve more than one carrier and will likely look to telephone charges as a model.

X.400 group coalesces

A group of computer and communications vendors has formally launched the X.400 Application Program Interface Association (APIA) with the goal of developing application program interfaces for the CCITT X.400 messaging standard.

Interfaces are designed to allow personal computer applications on networks to access X.400 services. "Our goal is to encourage the integration of LAN applications with wide-area services," said Stephen Lane, director of PC Services at Telenet Communications Corp. "With X.400, we hope to provide all users within an organization peer-level access to each other, regardless of their operation platform."

The group, which seeks to ensure interoperability among different vendors' implementations of X.400-based products, actually kicked off last year with a series of informal and organizational meetings.

X.400 is the first global E-mail standard that provides true OSI interoperability between systems and software from a variety of vendors, according to the APIA.

The standard is supported worldwide by vendors and users, many of whom consider the standard key to nonelectronic data exchange-related external communications with business partners and far-flung internal sites.

PATRICIA KEEFE

ANYWHERE YOU WANT.

At 3Com, we network more types of systems to more types of systems than anyone else.

At last count, that amounted to over 350 different mainframes and minis. And over 400 different PCs, terminals and workstations.

Any or all of which we can combine into a single, integrated network. That's because we make more modular networking products than anyone else.

Over 350 different products to be more exact. Everything from adapter

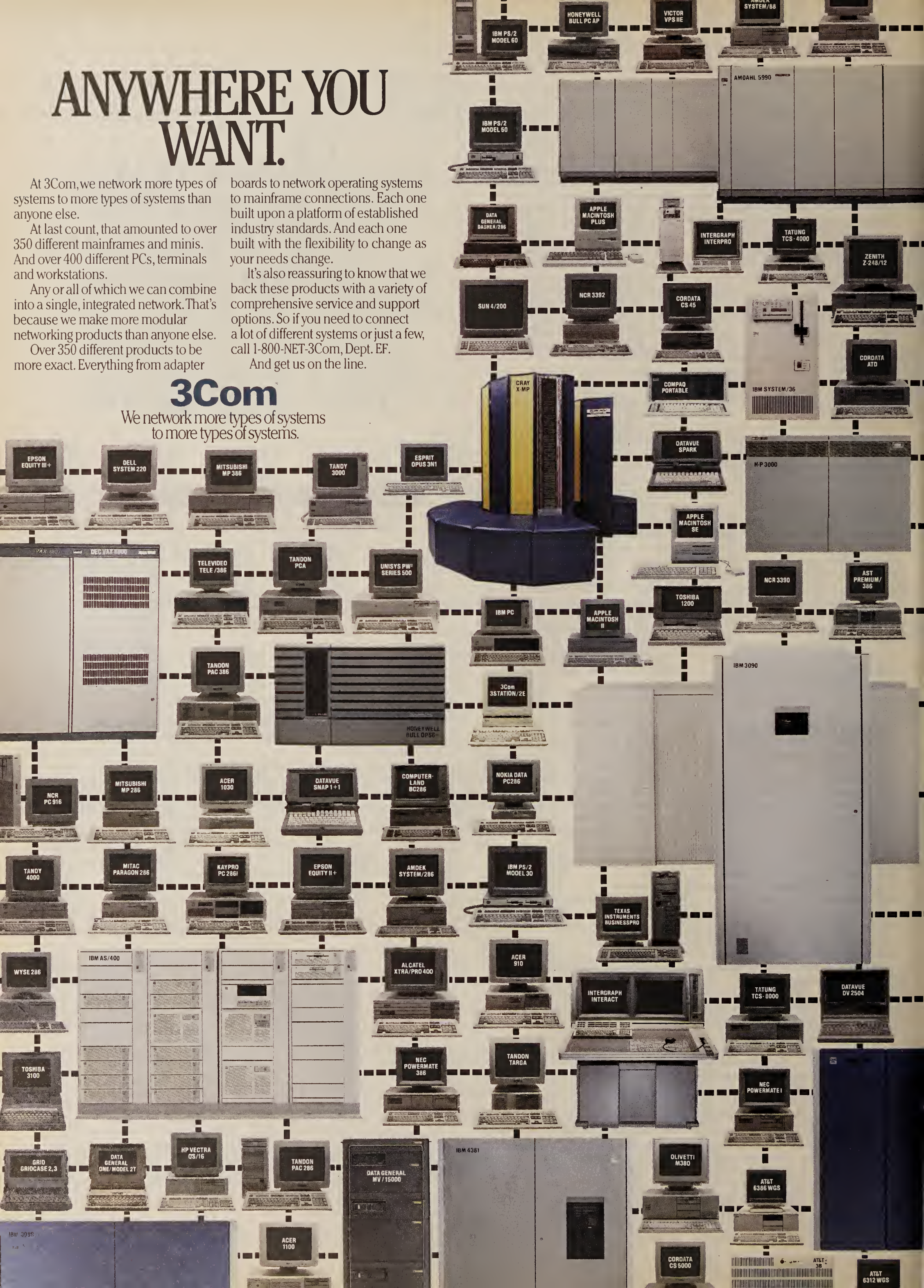
boards to network operating systems to mainframe connections. Each one built upon a platform of established industry standards. And each one built with the flexibility to change as your needs change.

It's also reassuring to know that we back these products with a variety of comprehensive service and support options. So if you need to connect a lot of different systems or just a few, call 1-800-NET-3Com, Dept. EF.

And get us on the line.

3Com

We network more types of systems to more types of systems.



NEW PRODUCTS

Local-area networking hardware

Cisco Systems, Inc. has introduced a four-member family of internetwork routers and terminal servers designed to provide connections to Token-Ring (IEEE 802.5) local-area networks.

The product line reportedly includes a Token-Ring terminal server that supports up to 96 devices, a Token-Ring-to-Ethernet (IEEE 802.3) router, a Token-Ring-to-Token-Ring router and a Token-Ring-to-wide-area network router that uses synchronous serial lines.

The four products are based on the company's Token-Ring Interface card, which provides a connection to Token-Ring networks running at speeds up to 4Mbit/sec.

Pricing ranges from \$11,900 to \$20,800, depending on configuration. Upgrade kits are available for current users.

Cisco Systems
1350 Willow Road
Menlo Park, Calif. 94025
415-326-1941

Digital Products, Inc. has introduced an unattended tape backup facility for use with the company's Netcommander sub-local-area network series.

Called Sublan Backup, the unit is designed to automatically protect data on departmental personal computer hard disks, including the hard disks of individ-



Digital Products' Sublan Backup

ual personal computers connected to local-area networks.

The product is available as a Sublan option and ranges in price from \$3,495 to \$3,995.

Digital Products
108 Water St.
Watertown, Mass. 02172
800-243-2333

Jupiter Technology, Inc. has introduced the System 100, a line of data communications computers the company said is intended for use at remote sites of large networks.

The systems can be used as a local-area network server or a multiaccess terminal cluster controller, and all of the systems utilize a proprietary communications operating system, the vendor said.

The System 100 is capable of serving from four to 384 lines and is priced from \$8,500.

Jupiter Technology
78 4th Ave.
Waltham, Mass. 02154
617-890-4555

Network management

Micom Communications Corp. has announced the X.25 Network Management System (XNMS).

The product is based on an IBM Personal Computer AT/Intel Corp. 80386 platform and is said to provide a graphics monitor, centralized configuration, event management and call accounting capabilities. The Xenix-based XNMS software program reportedly allows multitask processing on the AT, and file conversion is included for importing billing and statistics files to Lotus Development Corp.'s 1-2-3 spreadsheet.

The XNMS package, including software, the Xenix operating system and an Eicon Technology Corp. X.25 Communications Card and software, is priced at \$15,000, with deliveries scheduled to begin this month. The 386 PC AT is purchased separately.

Micom
4100 Los Angeles Ave.
Simi Valley, Calif. 93063
805-583-8600

BBN Communications Corp. has announced the migration of its Network Access System (NAS) from Digital Equipment Corp.'s Microvax II to a Microvax 2000 platform.

NAS was designed to protect sensitive information and system resources on BBN wide-area networks from unauthorized access. The system is composed of a centralized Master Database host and one or more distributed Access Control Server hosts, the vendor said.

Pricing starts at \$125,000 for a minimum configuration, which includes two Microvax 2000 computer systems.

BBN
150 Cambridge Park Drive
Cambridge, Mass. 02140
617-873-2683

Hewlett-Packard Co. has announced the release of several enhancements to the HP 4954A wide-area network protocol analyzer.

The product has been upgraded to include the following: the HP 4954I access and analysis software for Integrated Services Digital Network, priced at \$20,500; the HP 18320A language environment for C programming, priced at \$2,000; and the HP 18321A package for emulating X.25 Levels 2 and 3, also priced at \$2,000.

Hewlett Packard
3000 Hanover St.
Palo Alto, Calif. 94304
800-752-0900

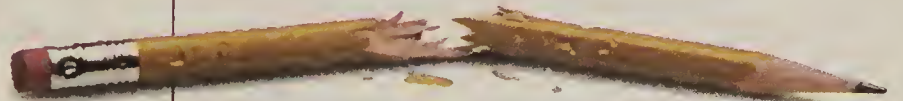
Emerald Systems Corp. has introduced a local-area network data management system for use with Novell, Inc.'s Advanced Netware.

Called EMQ, the system provides shared tape backup services and allows network supervisors to manage offline data storage systems.

Emerald Systems' Tape Backup Server system, which includes both EMQ and the VAST Device, is priced at \$8,490, the company said.

Emerald
4757 Morena Blvd.
San Diego, Calif. 92117
619-270-1994

And in the rest
of the company.



Links

Canon U.S.A. has expanded its family of personal facsimiles with the introduction of the Faxphone 15.

The desktop communications device reportedly incorporates both facsimile and telephone features into a single compact, lightweight design. According to the company, the unit transfers information at 9.6K bit/sec. and includes an automatic five-page document feeder, fine mode,



Canon's Faxphone

automatic background control and automatic reception capabilities.

The Faxphone 15 costs \$1,695.

Canon
One Canon Plaza
Lake Success, N.Y. 11042
516-488-6700

A remote communications processor that accesses incompatible databases simultaneously has been announced by Commnetics, Inc.

The stand-alone Commnetics CN-2000 reportedly features Custom Application Mapping software that lets terminal users enter one request, which is automatically reformatted to access incompatible databases residing on up to six host mainframes.

The unit utilizes a Motorola, Inc. 68000 processor and operates under Unix, the company said.

The CN-2000 is priced from \$150,000 for a 48-user system.

Commnetics
390 University Ave.
Westwood, Mass. 02090
617-326-1221

A software product that transfers data and integrates operations among Tandem Computers, Inc. computers and IBM mainframes has been announced by The Systems Center, Inc.

Network Datamover-Tandem (NDN-Tandem) enables Tandem computers running the Guardian operating system to communicate with mainframes running NDM-MVS, NDM-VM and other NDM products.

The package has file transfer, automated operation, management control and security functions, according to the company.

Pricing ranges from \$2,000 to \$30,000, depending on processor size.

The Systems Center
Suite 101
2477 Gateway Drive
Irving, Texas 75063
800-292-0104

An optically isolated RS-232 to RS-422 plug-in adapter has been introduced by Computer Dynamics, Inc.

According to the vendor, Opto-Adapt can connect RS-232 and RS-422 interface circuits bidirectionally at distances longer than 5,000 ft. The adapter can be used for long-haul communications between buildings and has a price tag of \$120.

The external power supply, which is not included, is available for \$10.

Computer Dynamics
107 S. Main St.
Greer, S.C. 29651
803-877-8700

A PC-to-PC telecommunications program for file transfer applications has been announced by Eidolon Technologies.

Called Quicktran II, the product reportedly uses compression and decompression technology for file transmission and can be used to set up an unattended electronic mailbox. An IBM Personal Computer, Personal System/2 or compatible system with a Hayes Microcomputer Products, Inc.-compatible modem is required.

Quicktran II costs \$39.95. An

individual copy is needed for each end of a file transfer.

Eidolon
P.O. Box 20680
Columbus Circle Station
New York, N.Y. 10023
212-795-7909

Dresselhaus Computer Products has announced that it is shipping its latest version of Smartprint, a laser sharing system for IBM,

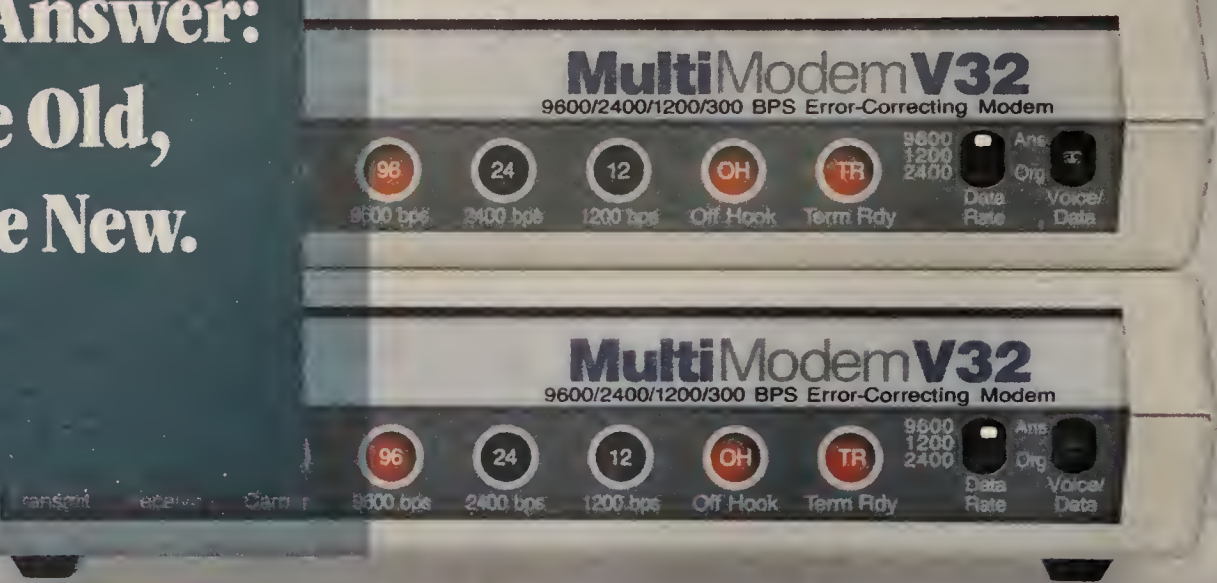
Apple Computer, Inc., Digital Equipment Corp. and other computers.

Smartprint/LSS is reportedly capable of connecting multiple processors to any laser printer. It is available in either four- or six-port versions, which are priced at \$179 and \$199, respectively.

Both versions of the product are offered in parallel or serial configurations.

Dresselhaus
Suite 405
8560 Vineyard Ave.
Rancho Cucamonga, Calif. 91730
800-368-7737

**The Right Answer:
Unplug the Old,
Plug In The New.**



MultiModem V32™ Full Duplex Modem Both 9600/4800 and 2400/1200/300 bits per second

Until today, your choices in V.32 9600 bps full duplex modems have been limited. They've been oversized and overpriced, and they couldn't even communicate with 2400 & 1200 bps modems.

Well, that's no longer the case! Multi-Tech's new **MultiModem V32** breaks through those barriers and more.

The **MultiModem V32** gives you 9600 bps full duplex operation with 4800 bps fallback, over both dial-up and leased lines, just like a CCITT V.32 compatible modem should.

However, the most remarkable thing about the **MultiModem V32** is its ability to perform automatic speed detection and switching between 9600, 4800, 2400, 1200 and 300 bps. This allows the modem to automatically match on-line speeds with other V.32, V.22bis and 212A compatible modems.

But that's not all.

The **MultiModem V32** incorporates MNP® Class 3 & 4 Error Correction and Class 5 Data

Compression with Speed Conversion. This gives you error-free communications, with throughputs well in excess of 9600 bps. Add to that a full "AT" command set, auto-dial/auto-answer, and a memory for phone numbers and option setting, and you get a modem with true upward and downward compatibility, that can satisfy most any application*, at a most affordable price.

Why not unplug your older, slower modems? Plug in the new **MultiModem V32**.

All things considered, the **MultiModem V32** is clearly the Right Answer.

Call us toll-free at **1-800-328-9717** for more Right Answers.

See Us At

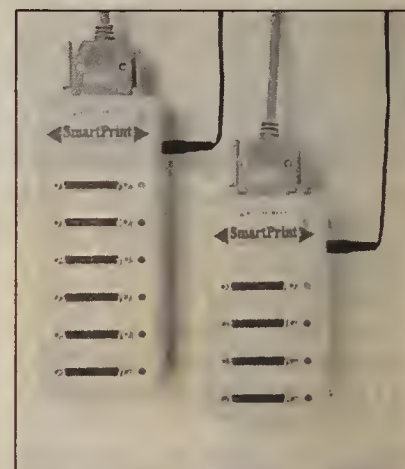
ENTISSRADS OF COMPUTERS & COMMUNICATIONS VOICE DATA IMAGE

INTERFACE '89

MultiTech®
Systems

The right answer every time.

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, Minnesota 55112 U.S.A.
(612) 785-3500 FAX (612) 785-9874
International Telex 4998372 MLTTC
International FAX (612) 375-9460



Dresselhaus' Smartprint

Cabletron Systems, Inc. has added two low-cost bridges to its family of Ethernet products and services.

The NB20E and NB25E series of two-port intelligent bridges were designed to provide high-performance connectivity between Ethernet and 802.3 local-area networks of various media, the vendor said. The products reportedly allow users to connect two or more Ethernet segments to create extended-distance LANs and increase bandwidth efficiency.

The bridges operate at the data link level of the Open Systems Interconnect model and are protocol-independent. The NB20E costs \$2,995, and the NB25E is priced at \$5,495.

Cabletron
10 Main St.
Rochester, N.H. 03867
603-332-9400

GSI-Danet, Inc. has announced a family of Unix-based Open Systems Interconnect (OSI) development products designed specifically for software development personnel.

The OSI Product Development Support System reportedly will guide designers through the development process, analyze the behavior of OSI software and test for OSI conformity before modules are integrated into the final product.

The products can be used with a variety of hardware systems and are priced from \$32,000.

GSI-Danet
Suite 300
1850 Centennial Park Drive
Reston, Va. 22091
703-758-0077

* We didn't forget the central sites! Call us for info on our Model MT932ER rack-mounted modems.

MNP is a registered trademark of Microcom, Inc.

A line-sharing device aimed at the computer, facsimile and telephone markets is now available from Lynx Automation, Inc.

Called Extraline, the product was reportedly designed to make one telephone line perform the work of two. It includes a micro-processor that automatically directs calls to a choice of devices and can operate in unattended mode, the vendor said.

Extraline costs \$299.

Lynx
P.O. Box 99068
Seattle, Wash. 98199
206-285-1754

Protocol converters

A protocol converter that connects the IBM 3262 printer with IBM's Application System/400 midrange computer has been announced by Black Box Corp.

The PQ-3262 is designed to allow the printer to attach directly to the host's twin-axial cable and will not degrade printer speed or other features, accord-



Black Box's PQ-3262

ing to the vendor.

The converter also facilitates connection between the 3262 and the IBM System/36 Models 5362, 5363 and 5364. It is priced at \$2,990.

Black Box
Box 12800
Mayview Road at Park Drive
Pittsburgh, Pa. 15241
412-746-5500

Modems/Multiplexers

Case/Datatel, Inc. has introduced three Bell-compatible modems.

The Rixon 4212 dual-speed, full-duplex modem for direct-distance-dialing switched networks reportedly operates at speeds up to 1,200 bit/sec. The Rixon 4202 asynchronous modem operates at speeds up to 1,800 bit/sec. Both devices are priced from \$469 to \$489.

The Rixon 4200 829 frequency unit was developed for standard termination in four-wire loaded or unloaded private line, 3002-type voice-grade data channels. It is priced from \$299

to \$329.

All are available in desktop and rack-mount versions.

Case/Datatel
55 Carnegie Plaza
Cherry Hill, N.J. 08003
800-424-4451

Codex Corp. has introduced two CCITT V.32 modems, the 2264 and the 2266.

The 2264 is available in a

stand-alone or nestable rack-mount version and supports operating speeds from 1,200 to 9.6K bit/sec. in asynchronous or synchronous modes over two-wire dial or two-wire or four-wire leased lines, according to the company. It is priced at \$1,695.

The 2266 is the international version of the 2264 and is priced at \$1,900.

Codex
Maresfield Farm
7 Blue Hill River Road
Canton, Mass. 02021
617-364-2000

E-Tech Research, Inc. has introduced a CCITT V.32-compatible, 9.6K bit/sec., full-duplex modem.

The E9696 is said to be capable of communicating with mo-

dem ranging from 9.6K bit/sec. to 75K bit/sec. on either full-duplex or half-duplex modes and synchronous or asynchronous modes over dial-up or leased lines. It is priced at \$1,695 with a two-year warranty.

E-Tech
No. 275
2700 Augustine Drive
Santa Clara, Calif. 95054
408-982-0270

Why didn't we go with HP in the first place?



Unlike Bob, some DP/MIS managers make it easy on themselves.

They set up their accountants with HP's 24-wire Rugged-Writer printer, the one with a 20,000-hour MTBF rating. And things are going well.

They give Marketing the elegance of a LaserJet

printer, the industry standard for years. They show Sales how quickly bulk mailings can go with the advanced LaserJet IID printer. And things are going well.

They give everybody his own personal DeskJet printer—the one that also has a 20,000-hour MTBF rating. And, of course, they get HP service

and support to match the quality of the products.

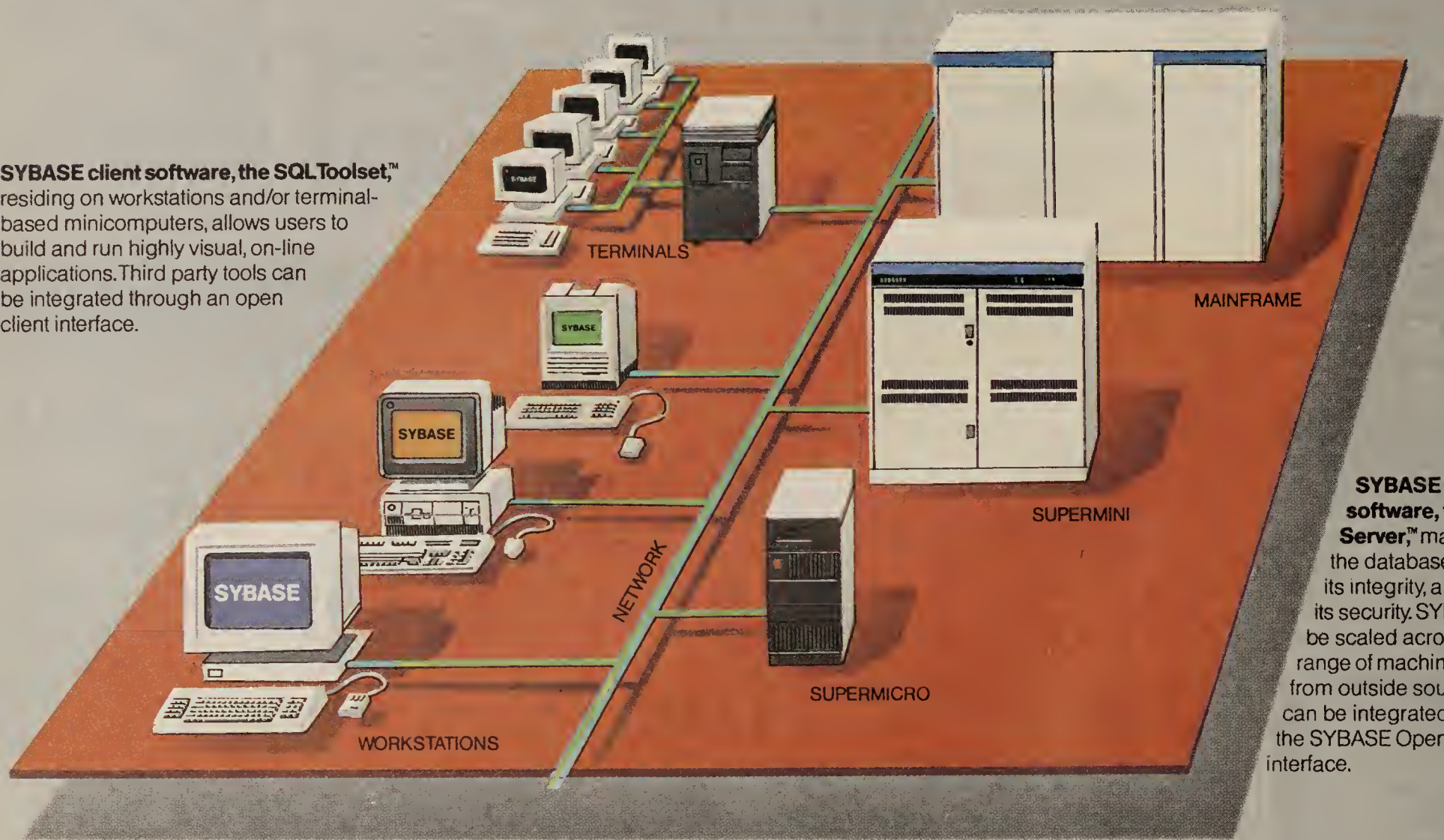
If only Bob had known.

For your nearest authorized Hewlett-Packard dealer, call 1-800-752-0900, Ext. 282H.

 **HEWLETT
PACKARD**

SYBASE® Client/Server Architecture...

SYBASE client software, the SQL Toolset™, residing on workstations and/or terminal-based minicomputers, allows users to build and run highly visual, on-line applications. Third party tools can be integrated through an open client interface.



SYBASE server software, the SQL Server™, manages the database, protects its integrity, and ensures its security. SYBASE can be scaled across a wide range of machines. Data from outside sources can be integrated through the SYBASE Open Server™ interface.

Increases Your Competitive Edge

Your on-line, mission critical applications manage real-time information to cut costs and improve efficiency. SYBASE is the first SQL-based relational database management system (RDBMS) built to handle these demanding applications. Only SYBASE client/server architecture, with its *programmable server*, delivers:

Scalable High Performance for dozens to hundreds of users updating and querying large databases.

Server Enforced Integrity for improved control and maintainability of critical information.

High Application Availability thanks to on-line maintenance and software-based fault tolerance.

Open Distributed DBMS to transparently integrate heterogeneous hardware and software systems.

Window-Based Tools for increased productivity with powerful, graphical, object-oriented tools.

Delivers Enterprise-Wide Benefits

SYBASE gives information managers hardware independence, including a transparent migration path from host-based applications to the workstation and distributed computing technologies of the 1990s.

SYBASE gives developers faster development cycles, simplified application maintainability, and greater application reliability, because integrity and business rules are centralized in the *programmable server*.

SYBASE gives end users powerful decision support tools and a graphical application interface that's intuitively easy to use.

On a Variety of Powerful Platforms

Ask about SYBASE for VAX/VMS, Sun/UNIX, Stratus/VOS, Pyramid/UNIX, OS/2, PC/DOS, HP/UX, IBM RT/AIX, NeXT/Mach, VAX/UNIX Sys V, AT&T/UNIX, Apollo/UNIX, and Macintosh HyperCard.

Microsoft and Ashton-Tate selected SYBASE for the OS/2-based SQL Server. NeXT and Stratus selected SYBASE to be shipped with every computer system. And hundreds of companies in financial services, telecommunications, manufacturing and government/defense have chosen SYBASE.

Find out how SYBASE can effectively manage your on-line applications. Use the coupon below or call 415/596-3400 about a free SYBASE seminar.



6475 Christie Ave., Emeryville, CA 94608

SYBASE Free Seminar Schedule

All seminars run 9 am to noon.

March 1989

#1	San Francisco	3/7
#2	Toronto	3/8
#3	New York City	3/9
#4	Boston	3/14
#5	Houston	3/15
#6	Chicago	3/16
#7	Iselin, NJ	3/21
#8	Dallas	3/22
#9	Los Angeles	3/22
#10	Austin, TX	3/29

April 1989

#11	Washington, DC	4/4
#12	Montreal	4/4
#13	Philadelphia	4/5
#14	Cincinnati	4/6
#15	Detroit	4/14
#16	Denver	4/14
#17	Minneapolis	4/18
#18	Ottawa	4/18
#19	San Jose	4/25
#20	New York City	4/26

May 1989

#21	Calgary	5/9
#22	Orange Cty., CA	5/11
#23	Hartford	5/16
#24	Seattle	5/18
#25	Chicago	5/24
#26	Los Angeles	5/24
#27	Indianapolis	5/25

June 1989

#28	St. Louis	6/6
#29	Atlanta	6/7
#30	Vancouver, BC	6/8
#31	Portland, OR	6/13
#32	Boston	6/15
#33	Rochester	6/16
#34	New York City	6/20

© 1989 Sybase, Inc. SYBASE and the SYBASE logo are registered trademarks of Sybase, Inc. SQL Server, SQL Toolset and Open Server are trademarks of Sybase, Inc. All other product and company names are not trademarks of Sybase.

☐ Register me for seminar # _____ on (date) _____ in (city) _____.

☐ Send me more information.

Mail with your business card to:
Seminars/Sybase
 6475 Christie Ave.
 Emeryville, CA 94608

PRODUCT SPOTLIGHT

RELATIONAL DBMS

RDBMS show they can pull OLTP weight

BY ALAN RADDING

For years, relational database management systems have been regarded with suspicion in terms of their ability to handle on-line transaction processing (OLTP) applications. Recently, however, improvements in relational DBMS products and some changes in thinking about what cost-effective transaction processing is really all about have combined to produce more application opportunities for RDBMSs at this level.

For example, at Capital Market Technology, Inc. (CMT), a Berkeley, Calif.-based foreign currency trading firm, a Sybase, Inc. RDBMS running on a Sun Microsystems, Inc. workstation is used for 24-hour on-line updating of currency prices. According to Brian Chapman, computer operations manager, the system supports about 20 concurrent users and a transaction volume that averages around 15,000 per day. CMT shuffles its clients' money from one currency to another to take advantage of minute-by-minute market fluctuations, Chapman says, and the Sybase RDBMS is a critical cog in that process.

Currency trading represents a specialized niche within the financial services industry, and CMT is typical of the users who are taking a chance on the combination of relational technology and OLTP.

On-line transaction processing is a broad concept but is generally understood to involve the running of mission-critical production applications in a real-time environment. Conventional OLTP applications involve very high volumes of generally simple, straightforward tasks, such as debit/credit transactions.

The classic OLTP systems — airline reservations and bank



BLAIR THORNLEY

automated teller networks — predate relational technology. "Nobody would dream of trying to rewrite one of those major existing programs," observes Kenneth Bosomworth, president of the market research firm International Resource Development, Inc. in New Canaan, Conn.

The real growth potential for RDBMS in OLTP, Bosomworth says, is in applications written for smaller niches within the traditional heavy-OLTP industries or in areas, such as factory automation, that lie outside the usual domain of OLTP.

OLTP in the factory is not very different from OLTP in an environment like banking, says Eric F. Palmer, president of The Palmer Group in Atlanta. True, the input comes from a factory floor device reporting an operation instead of from a teller taking a deposit, but the require-

ments on the system are virtually identical, he maintains. "OLTP in integrated manufacturing just means you are getting a stream of input from a lot of devices instead of people," Palmer points out.

Palmer, a database specialist, recently served as systems integrator on a state-of-the-art factory automation project for a Northeast defense systems contractor that incorporated Relational Technology, Inc.'s Ingres RDBMS.

According to Palmer, Ingres 5.0 is performing just fine on the project, even though the factory runs as many as 140 concurrent users and handles up to one million multistatement transactions each day. Response time is generally calculated in subseconds, he says, although a few transactions may take as long as 10 seconds. "We modeled the frequency of transactions and optimized

for the ones that run thousands of times rather than the handful that run just a couple of times," Palmer adds.

One of the things that is happening, suggests George Schussel, president of Digital Consulting, Inc. in Andover, Mass., is that although most RDBMSs still cannot compete with hierarchical products on the basis of pure speed, many organizations are coming to feel that speed of throughput is not the only consideration and transactions per second is not the only yardstick when it comes to transaction processing.

"Most businesses don't care about transactions per second," Schussel maintains. "What really is important is transactions per dollar, and this is where an RDBMS can really beat a hierarchical system. The RDBMS may not be faster, but it will be cheaper."

The savings, Schussel and others say, come from flexibility that the relational model provides. A relational database is a database in which the logical data is organized simply as tables without the pointers or structural elements of a hierarchical database and independent of the physical data. Using keys and indexes, an RDBMS automatically navigates through the database

INSIDE

Fantasy or Fact?

Myths and realities about relational technology. Page 76.

Crowding in the Corner

Database machines fight to defend traditional turf. Page 77.

Smooth Move

Transition to an RDBMS requires careful planning. Page 79.

Radding is a Boston-based free-lance writer.

Unlock Programmer Productivity



With System 1032 Application Facility

System 1032/AF automatically generates most of your application code from menu selections. Yet you can add custom procedures wherever you need something special.

CompuServe

Data Technologies
Tel: (617) 661-9440

OLTP

FROM PAGE 63

with the assistance of an optimizer.

The separation of the logical data from the physical structure of the database allows you to create the database without first having to rigidly define how the data is to be used. Tables can be added to or deleted from the database or columns and rows can be added to or deleted from existing tables without affecting the data already there and the applications already on the system.

The result is that a relational database is faster and less costly to develop and maintain compared with traditional database schemes. "Maintenance costs for hierarchical systems are so high that you can spend a lot on hardware for a relational DBMS and still save money by comparison," says David Ells, president of the Data Administration Management Association (DAMA) in Seattle. Hardware performance keeps coming down in price, Ells notes, but the cost for programmers does not.

Brian Martin, senior software engineer at the Denver-based Astronautics Group of Martin Marietta Corp., says he appreci-

ates that distinction.

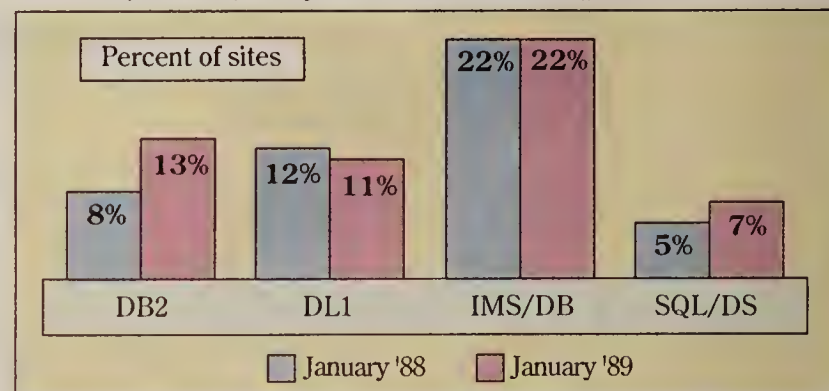
"There's a guy down the hall running a database on IMS, and making changes is so hard that they do it only twice a year. We modify ours on-line every day," Martin says.

Martin has no illusions about the reality behind many of the

scribe the Astronautics Group's application, but that is definitely the way that Martin, whose group maintains the human resource database for five Martin Marietta companies in Colorado, sees it. "This isn't your typical OLTP application, like retail or a bank, but we do a lot of concur-

New blood

While IBM's relational DBMS products continue to make inroads into Fortune 1,000 sites, IMS penetration has leveled off



SOURCE: COMPUTER INTELLIGENCE
CW CHART: DOREEN DAHLE

complaints about relational DBMSs in an OLTP environment. He has seen most of them in action. But, having stuck with Oracle Corp.'s Oracle since Version 2, he can also testify to the dramatic improvement that has taken place in that product since 1983.

Some might quibble with the use of the label OLTP to de-

rent transactions every day," he says.

In fact, the Martin Marietta human resource system is made up of eight databases, each containing 15 to 150 tables. The entire database requires 750M bytes of memory. The largest table is 750,000 records. Because employees are moved frequently as job locations and assignments

"DYL-280 II's DB2 Interface enables us to do mixed mode processing and report generation in one easy step."



“ DYL-280 II's DB2 Interface enables us to do mixed mode processing and report generation in one easy step. QMF is fine for straight report writing, but we want to be able to read and update a DB2 table using a flat file, and then produce a report simultaneously. This can't be done with QMF, and the other alternative is to use Cobol. DYL is far simpler to use and much faster. Another feature we like is the way DYL handles the return code.

We're using the DB2 interface more and more, both as a programmer's tool and as an end user's tool. Everyone is very pleased with the way the product has performed for us. **”**

Ms. Jean Mulcahey
Advisory Programmer Analyst
MONUMENTAL LIFE INSURANCE

DYL-280 II is the information management system for IBM mainframes. Free-form, English-syntax software that consistently delivers reliable results and complete accessibility to IMS, DL1, DB2*, IDMS† and IDMS/R† DBMS plus full SQL/DS* support.

With over 20,000 users worldwide, DYL-280 II continues to provide professional support to today's MIS professionals.

For more details on the DYL-280 II information management system, please call Sterling Software, Dylakor Division at **818-718-8877**.

STERLING SOFTWARE
Dylakor Division

The company that cares about its customers and its products.

9340 Owensmouth Ave., P.O. Box 2210
Chatsworth, California 91313-2210



*DB2 and SQL are trademarks of IBM Corp

†IDMS and IDMS/R are trademarks of Cullinet Software, Inc.

DISCOVER ENTERPRISE:

An Unprecedented Advantage In Code Through The Barrier Of

Welcome to power programming. And a productivity advantage as high as 30:1.

It's Cullinet's new Enterprise:Generator.™ Breakthrough technology that allows you to reduce application backlogs and get your applications up and running in just weeks or hours, instead of the more typical months or years. Without giving up performance. Because Enterprise:Generator actually generates 3GL code from high-level business specifications.

And it generates code independent of any database. So you can develop applications on virtually any computing platform, for virtually any computing platform or database—including IDMS/R,™ Enterprise:DB,™ or DB2,™ Oracle,™ Rdb™ and RMS™ files.

Unmatched Productivity and Performance. You can create applications with Enterprise:Generator 30 times faster than with Cobol, 10 times faster than with a 4GL. More importantly, the code produced is highly structured and bug-free, resulting in superior production performance.

Truly Portable Applications. Only Enterprise:Generator offers you complete hardware and software independence—five full levels of portability. Its applications will run on virtually any platform, using any standard operating system or programming language, including Cobol, Fortran and C. And Enterprise:Generator accesses any ANSI-SQL DBMS, such as Enterprise:DB,

DB2, Rdb, Oracle and others.

Greater Power for Competitors' Databases Than the Competitors Themselves Can Provide. Enterprise:Generator is unique in providing the same dramatic productivity gains and portability on the competition's database products as it does on Enterprise:DB. You'll get the same edge with DB2, Rdb, Oracle and others. Only Enterprise:Generator enhances the competition's products better than the competition does.

Unparalleled Productivity Boost for IDMS/R. To customers using IDMS/R 10.2 with LRF, Enterprise:Generator gives an unparalleled programmer productivity boost. What's more, applications developed on IDMS/R are fully

CULLINET GENERATOR

Generation Technology That Breaks Programmer Productivity.

portable to Enterprise:DB, or any other ANSI SQL DBMS. On top of all that, IDMS/R users will get Enterprise:DB with no additional license fee.

Enhanced Cullinet Applications.

Cullinet is using the power of Enterprise:Generator to build and extend its own Enterprise:Applications in Manufacturing, Finance, Materials Management, Distribution, Banking and Human Resources. Offering customers the industry's strongest line of fully portable, distributed applications.

Network Computing Redefined.

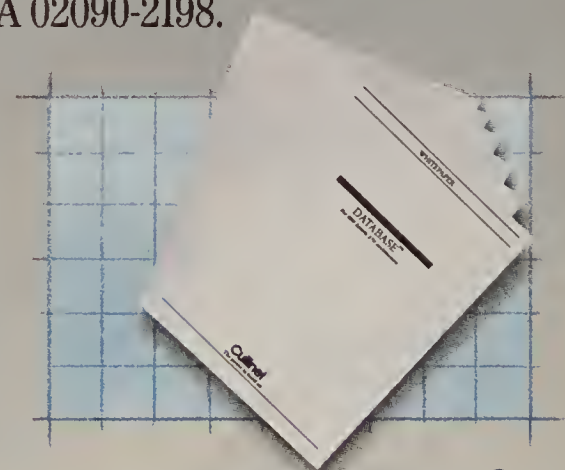
Cullinet has raised the concept of network computing to a new level. Enterprise:Generator is a "smart" generator that is integrated with our

Enterprise:Network™ architecture software, which handles all communications between applications through such common protocols as IBM's APPC™, LU6.2™, NAMED PIPES™, Digital's DECnet™, and others. In fact, it is so smart that you will never have to write a single line of code for network communications. Only Cullinet gives you this networked computing capability in a cooperative processing environment.

CALL 1-800-551-4555 FOR A CULLINET WHITE PAPER TODAY.

Cullinet has white papers available on the following—Enterprise:Generator, Enterprise:DB, Enterprise:Tools™, Enterprise:Applications™, Enterprise:Network Computing and IDMS/R.

For your copy, or for information on the Cullinet Enterprise Computing Seminar nearest you, call 1-800-551-4555. Or write Cullinet Software, Inc., Marketing Services, 400 Blue Hill Drive, Westwood, MA 02090-2198.



Cullinet®
The power to build on.

OLTP

CONTINUED FROM PAGE 65

take advantage of it," White says.

The real key to the performance of an RDBMS is the optimizer, according to Jeffrey Tash, president of Database Decisions, Inc., a Newton, Mass., consulting firm. The optimizer performs the automatic navigation of the database, he says, after translating the high-level SQL command into a low-level navigational strategy.

The use of an inverted component to reduce I/O and the extensive use of indexes allows the optimizer to boost performance, Tash explains. Furthermore, if enough memory is available, indexes can

be put into memory so that the relational DBMS navigates at memory speed.

The experience of Questar Services, the data processing division of Mountain Fuel Supply Co., a natural gas utility in Utah and Wyoming, illustrates the critical importance of indexing in the optimizer. Questar has been testing DB2 in an effort to determine whether to switch its 20-year-old customer service OLTP system to the RDBMS because of a growing need for flexibility.

Although the Questar system, with 400 concurrent users, does not run particularly high-volume or complex transactions, performance, as seen in response time, is critical. "This system is a major part of the company. This is where we get our revenue," says Jerry Edwards, sys-

tems analyst at Questar's information systems engineering department.

In a test of the system, Questar loaded a table with 300,000 records, with and without an index, and then tried to bring up 15 accounts. Without an index, it took 23 seconds. With the index, it took one second. "Indexing is the key," Edwards concludes.

To assist the optimizer, most of the new RDBMSs offer some kind of precompiled transaction. Essentially, the precompiled instructions allow the system to store the navigation for frequently run transactions so that the system does not have to refigure the navigation each time the operation is called up.

"Sybase give us something they call 'triggers,' which are stored procedures,"

Mixed breeds

Some vendors have tried to bridge the gap between relational DBMSs and conventional systems for OLTP by developing hybrid systems consisting of a relational-like front end attached to a hierarchical database engine.

This approach appeals to some users because they say it gives them the elements they most like about relational technology while allowing them to stay with an underlying structure they already know can do the job.

The Software AG Adabas system in use at the University of Texas at Austin, for example, provides some relational-like capabilities but retains an inverted file structure. That is all the relational flavor an OLTP environment needs, according to Randy Ebeling, assistant to the director of data processing. "It is the language, not the structure, that needs to be relational," he says.

Many would argue that point, but Ebeling, who ran benchmark tests on a mix of relational and non-relational products from five vendors, is convinced. The university needed to manage five production databases averaging about four million transactions per week, he says, and trying to handle that kind of load with a purely relational DBMS would have required too much hardware.

The reasoning behind the adoption of a hybrid system at the U.S. Customs Office is slightly different. When it decided that a change was needed in the DBMS used to track all shipments and individuals crossing U.S. borders, the Washington, D.C.-based agency simply wanted to combine what it already had — a 7-year-old Datacom inverted list database with a front end incorporating relational-style features.

That reasoning led it to CA-Datcom/DB, a newer product from Computer Associates International, Inc., which is based on Datacom but incorporates an SQL-like front end and a number of relational features including set processing and set selection.

This system was presented as "a production implementation of the relational database," not as a purely relational product, says Clyde McPherson, a CA senior software support manager.

That tack seemed like "the best of both worlds" to Glenn Samples, chief of the database branch of U.S. Customs. The Customs Office operation is large, he says, and it is doubtful that a purely relational system would be robust enough to support 8,000 concurrent users generating an average of 1,300 requests per second.

ALAN RADDING

Our DB2 software is up and running.

Everyone else is still making promises. Integral Systems' DB2 based Human Resource application software is up and running. It has been since 1987. In fact, IBM selected Integral Systems as its first Human Resource Business Partner specifically for our DB2 software. Which is exactly what you'd expect from the number one Human Resource company in the industry.

The Perfect Application

After all, employee information is the heart of corporate data and must be easily accessible and well structured. Our DB2 software allows you to select exactly the program components you need — Personnel Management, Payroll

Processing and Reporting, and Benefits Administration are all available. All these products can be connected to our powerful family of other mainframe and microcomputer products.

The Leader

For 16 years we've dedicated ourselves exclusively to Human Resource software. What we deliver today, others will still be talking about tomorrow. So call our toll-free number now for a fact-filled brochure. In the U.S. call (800) 824-8199, in California, (800) 824-8198, Locally and in Canada (415) 939-3900.

Sales and support offices located throughout North America

INTEGRAL SYSTEMS

The Deciding Factor

2185 N. California Blvd, Walnut Creek, CA 94596



All you need for superior
Model 30 performance is one
new piece of equipment.



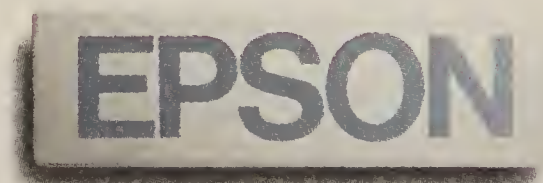
Epson Equity 1e. 8/10MHz 8086 microprocessor, 640K RAM, 720K 3.5" FDD, serial, parallel and mouse ports, one year limited warranty. IBM is a registered trademark of International Business Machines Corp. Epson is a registered trademark of Seiko Epson Corporation. Equity is a trademark of Epson America, Inc., 2780 Lomita Blvd., Torrance, CA 90505. **(800) 922-8911.**

An Equity Ie.

In speed and versatility, the sleek Equity™ Ie goes faster and farther than other machines in its class.

At 10MHz, it runs 25 percent faster than the IBM® Model 30. With four industry standard expansion slots—one more than IBM—the Equity Ie gives you flexibility and room for growth.

Even better, the brand new Equity Ie comes with built-in MCGA video and a palette of 256,000 colors for sophisticated graphics. Of course, the Equity Ie offers the reliability, quality and value that millions of people have come to expect from Epson® computers and printers. The new Equity Ie. It's a Model 30 class computer that others will be modeling theirs after.

The Epson logo is displayed in a bold, sans-serif font. The letters are dark blue or black, with a slight shadow effect behind them, giving it a three-dimensional appearance. The logo is set against a light, textured background that resembles a metallic or brushed surface.

**WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY.™**

says CMT's Chapman. With the trigger, he stores the instructions for a highly repetitive procedure such as inserting a new price. When the procedure is required, the system "doesn't have to reinterpret raw SQL," he explains.

The Sybase triggers can also be used to enforce referential integrity, Chapman points out. When a certain procedure is activated that would affect referential integrity, a trigger can be used to direct the system to go automatically to the related reference and make the appropriate changes. Additional triggers can further enforce referential integrity right through the system.

Ingres' version of the precompiled procedure is the repeat query. "It is helpful for those queries that take time to opti-

mize but are short to run. Or, if the query is complex or there are a large number of words to parse, we can get performance gains for that, too," Palmer reports. In Version 6, the repeat queries will automatically reoptimize if values change.

The Ingres optimizer takes a near-best solution approach but allows users to tune the optimizer even further, he says.

The system allows users to print out the query execution plan. With the printout of the optimizer's navigation, Palmer can look for unexpected occurrences.

"We might see that we need an index someplace, maybe where we thought we already had one. It's a really helpful fea-



DAMA's Ells

ture when a query doesn't perform," he reports.

At the software tool level, there are two types of performance enhancement products now being provided with RDBMS products. One type allows you to monitor what the optimizer is doing; the other allows you to collect better data on which to base its navigation.

Optimizers are designed to make assumptions about the quality of the data, usually based on statistical theory concerning ranges of values and distribution. Often, Palmer says, the optimizer would choose a different navigation strategy if it knew the actual values in the table.

To improve upon the theoretical assumptions, Ingres provides a tool called Optimize DB, which allows the system to collect the real statistics out of the table. "You can sometimes get a performance gain of 10 times after running Optimize DB," Palmer maintains. Sometimes, however, there is no change at all.

Early models

Early implementations of RDBMS, used primarily for decision support, had "the flexibility of the relational model and a lot of overhead," says Peter Kastner, vice-president of the Aberdeen Group, a consulting and market research firm based in Boston. "Now, the vendors are putting in the go-fast tricks they learned in non-relational DBMSs in response to

No other application development software is quite this fast.



Sure, you expect speed. But not this much speed. Truth is, anyone who has ever developed applications is surprised by PROGRESS. Like the developers who gave it the highest satisfaction rating among the 4GL DBMSs surveyed by DATAPRO.*

PROGRESS is a high-performance 4GL designed specifically for building, modifying, and customizing database applications. It requires less code than other 4GLs, it's crash-proof, has SQL, and it's transparently portable across UNIX, XENIX, ULTRIX, AIX, MS-DOS, VAX/VMS, and CTOS/BTOS, as well as LANs.

Well, hold your horses.

NOW PROGRESS APPLICATION DEVELOPMENT IS EVEN FASTER WITH PROGRESS FAST TRACK.*

PROGRESS FAST TRACK is a menu-driven application builder that allows developers and users to paint screens, create menus, generate reports and perform queries. Unlike other application builders, PROGRESS FAST TRACK provides you greater flexibility and control by generating 4GL code.

For only \$95†, you can test drive a copy of PROGRESS. And if it's not as fast as we say it is, we'll refund your money. So call today.

And hang on tight.

Send \$95† for your PROGRESS Test Drive.
Or call: Progress Software Corporation
5 Oak Park
Bedford, MA 01730

1-800-FAST 4GL

(In Massachusetts, call 617-275-4500)
FAX: 617-275-4595
Telex: 509965
(In Canada, call 416-620-6766)



PROGRESS
FASTEST FROM START TO FINISH.

Offices in: Atlanta, Boston, New York, San Diego, Washington, D.C., Amsterdam, Brussels, Cologne, Copenhagen, Helsinki, London, Melbourne, Montreal, Munich, Oslo, Paris, Reykjavik, Stockholm, Sydney, Toronto, Vienna, and Zurich.

*DATAPRO Reports on Software, DATAPRO 70 © 1986, 1987, DATAPRO RESEARCH CORPORATION. †For international orders please call for shipping and handling information.

PROGRESS and PROGRESS FAST TRACK are registered trademarks of Progress Software Corporation, developers of advanced software technology for business and industry. The following are trademarks of the following companies: VAX, VMS and ULTRIX of Digital Equipment Corporation; UNIX of AT&T; MS-DOS and XENIX of Microsoft Corp.; CTOS of Convergent Technologies, Inc.; BTOS of Unisys Corporation.

Beware the benchmark

How can a user determine if a relational DBMS will be fast enough or robust enough? The only way to tell is to benchmark the specific applications.

Vendors are boosting the overall performance of their RDBMS/OLTP systems, but published RDBMS/OLTP benchmarks are virtually meaningless, consultants say. It is difficult to determine from the benchmark tests how much of the performance gain comes from the improved implementation of the relational model and how much is from more powerful hardware or better use of the architecture.

For instance, IBM's publicly released transaction-per-second rating for DB2 indicates Release 1.3 ran at 123 transaction/sec.; Release 2.1 reportedly jumped to 270 transaction/sec. — a 119% increase. However, Release 1.3 was benchmarked on a 3090 Model 600E, while Release 2.1 was measured on a 3090 Model 600S.

When asked to factor for a constant hardware platform — in this case the 3090 Model 600E — Release 2.1 ran at 186 transaction/sec. and IBM reported only a 51% gain between the two releases. All of the above transaction-per-second ratings, according to IBM, were computed for complex SQL calls, not simple debit/credit transactions.

Hardware power is not the only factor users need to consider. The type of application being run can also influence the relational database's performance.

Robert Davoli, president of D&N Systems, Inc. in Burlington, Mass., is a database consultant frequently called upon to perform benchmarking. He points out, "If you want to run relational in OLTP, then you have to take the time to run benchmarks that reflect your application. Then you know in black-and-white. You're sure. It works or it doesn't."

ALAN RADDING

OLTP's demands," he says.

Most of these improvements have nothing to do with the relational model — they come from better use of the overall system architecture or by providing a better set of software tools.

Kastner, however, is not all that concerned about relational purity and does not think that users who are interested in RDBMSs for on-line transaction

processing should let the issue worry or deter them, either. "Users have to be concerned with developing systems that make money for the business," Kastner says. In some cases, gaining RDBMS/OLTP performance may entail giving up some of the flexibility of the relational model, he says, but if benchmarking indicates that is what is necessary, users should not let

that stop them.

Evidence suggests that fewer users are letting anything deter them. For instance, when a travel reservation system was being built in the Southwest recently, there was no question that the OLTP system would be relational. "We liked the [relational] application. We didn't even discuss whether it was relational or not," says the system's technical

support manager. The reservation system uses a Sequent Computer Systems, Inc. computer with a Unix-based RDBMS to handle 60 concurrent users with a subsecond response.

Bill Werbin, vice-president of wholesale information systems development at Manufacturers Hanover Trust Co. in New York, is so confident in the growing power of the RDBMS products

in OLTP that he is planning a new DB2 system with high transaction rates for 1990.

The bank has used relational transaction processing products before, but only for low-volume applications, Werbin says. Now, DB2 advances have convinced him that it is time to try something more ambitious. "Given what we've seen, I don't expect any problems," he says. •

Market booster

Interest in relational DBMSs may actually be helping to fuel a growth surge in the OLTP market, which currently is valued at around \$30 billion, according to Kenneth Bosomworth, president of International Resource Development, Inc. He notes, "Most people installing OLTP today are going for the relational type [of DBMS]."

The growing interest in RDBMS for OLTP is shaking up what had been a fairly stable and quiet vendor scene. IBM and Digital Equipment Corp. continue to dominate the market (DEC mainly on the strength of the large number of VAXs in use in OLTP rather than any particular RDBMS/OLTP offerings), Bosomworth reports. Tandem Computers and Stratus Computer continue to lead the fault-tolerant end of the business.

But a host of young hardware and software companies, such as Sequent Computer Systems, Pyramid Technology Corp., Oracle, Sybase, Relational Technology and Informix Software, Inc., are making a significant push into the market. These companies have grabbed major positions.

Older companies, including Cullinet Software, Inc., Software AG of North America, Inc. and Computer Associates International, Inc., are re-vamping existing products to provide relational capabilities or introducing completely new RDBMS products.

RDBMS vendors such as Britton Lee, Inc. and Teradata Corp. are also staking out positions in OLTP, often as the back-end processor.

ALAN RADDING

We're delivering proven DB2-based financial software

Your Migration to DB2 Begins at Walker—Today



IBM's market-leading DB2 is the new standard for database management systems. Walker Interactive Systems' unique strategic architecture provides a straightforward migration path to DB2. Now you can put Walker's proven DB2-based systems to work for you — safely, easily, and immediately.

With Walker financial software, you can continue operating with VSAM or your existing DBMS — IMS, ADABAS, IDMS, or DATACOM — while migrating to DB2 on a timetable that's best for your organization.

Cross-Industry Relationship with IBM

Walker has passed IBM's rigorous standards, resulting in cross-industry, multi-product recognition in IBM's Application Specialist Program. Because our systems follow IBM's industry standard SAA, Walker software assures long-term viability and inherent expandability.

Available Immediately

While others may make promises, Walker Interactive Systems is delivering DB2-based financial software which is fully integrated, completely functional, and thoroughly tested today.

Our Strategic Management Systems include General Ledger, Accounts Payable, Purchase Order, and Productivity Tools. To ensure success throughout the life of your financial software, Walker offers a full range of implementation and support services.

For facts and insights into DB2 and Walker financial software solutions, call Barbara Bond at 415/495-8811, or write us at 100 Spear Street, San Francisco, CA 94105. Available later this year: Inventory Management, Asset Management, and Capital Projects Tracking.



Walker Interactive Systems™



WHY YOU SHOULD CON 386 SYSTEMS, DESPITE THEIR

Our new 386⁺-based systems are priced about 35% less than comparable systems—like Compaq's[®]. Which may make you wonder if we've left something important out. Like high performance.

Well we haven't.

In fact, these are among the fastest 386-based systems available. With more advanced features than you'd get in systems that list for up to \$3000 more.

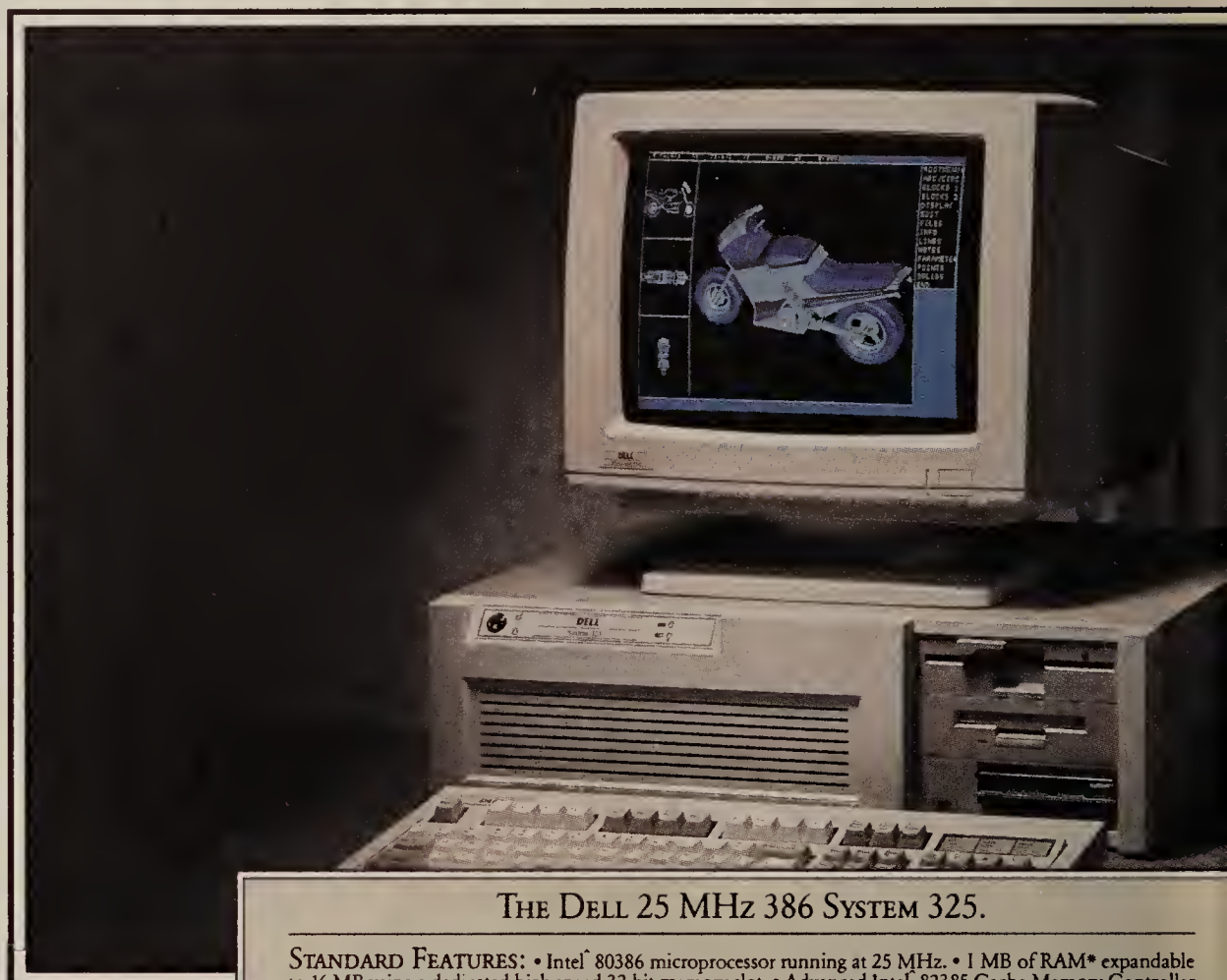
Like Compaq's.

For instance, our 20 MHz System 310 offers you the most extraordinary value available in any 386-based system. It's the machine that PC Magazine (6/14/88) described as "fast enough to burn the sand off a desert floor."

AND IF THAT SOUNDS FAST, WAIT TILL YOU SEE OUR NEW 25 MHz 386-BASED SYSTEM.

At 25 MHz, our new System 325 offers you the highest possible performance in a 386.

Like the System 310, it utilizes the very latest technology, including the Intel[®] 82385 Cache Memory Controller, advanced 32-bit architecture and high performance drives. And of course, both systems are fully IBM[®] PC compatible.



THE DELL 25 MHz 386 SYSTEM 325.

STANDARD FEATURES: • Intel[®] 80386 microprocessor running at 25 MHz. • 1 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot. • Advanced Intel[®] 82385 Cache Memory Controller with 32 KB of high speed static RAM cache. • Page mode interleaved memory architecture. • VGA systems include a high performance 16-bit video adapter. • Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math coprocessor. • 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive. • Enhanced 101-key keyboard. • 1 parallel and 2 serial ports. • 200-watt power supply. • 8 industry standard expansion slots.

**Lease for as low as \$245/Month.
The Dell System 325 is an FCC Class A device, intended for business use only.

SYSTEM 325	WITH MONITOR & ADAPTER	
	VGA Mono	VGA Color Plus
Hard Disk Drives		
150 MB-18 ms ESDI	\$6,799	\$7,099
322 MB-18 ms ESDI	\$8,799	\$9,099

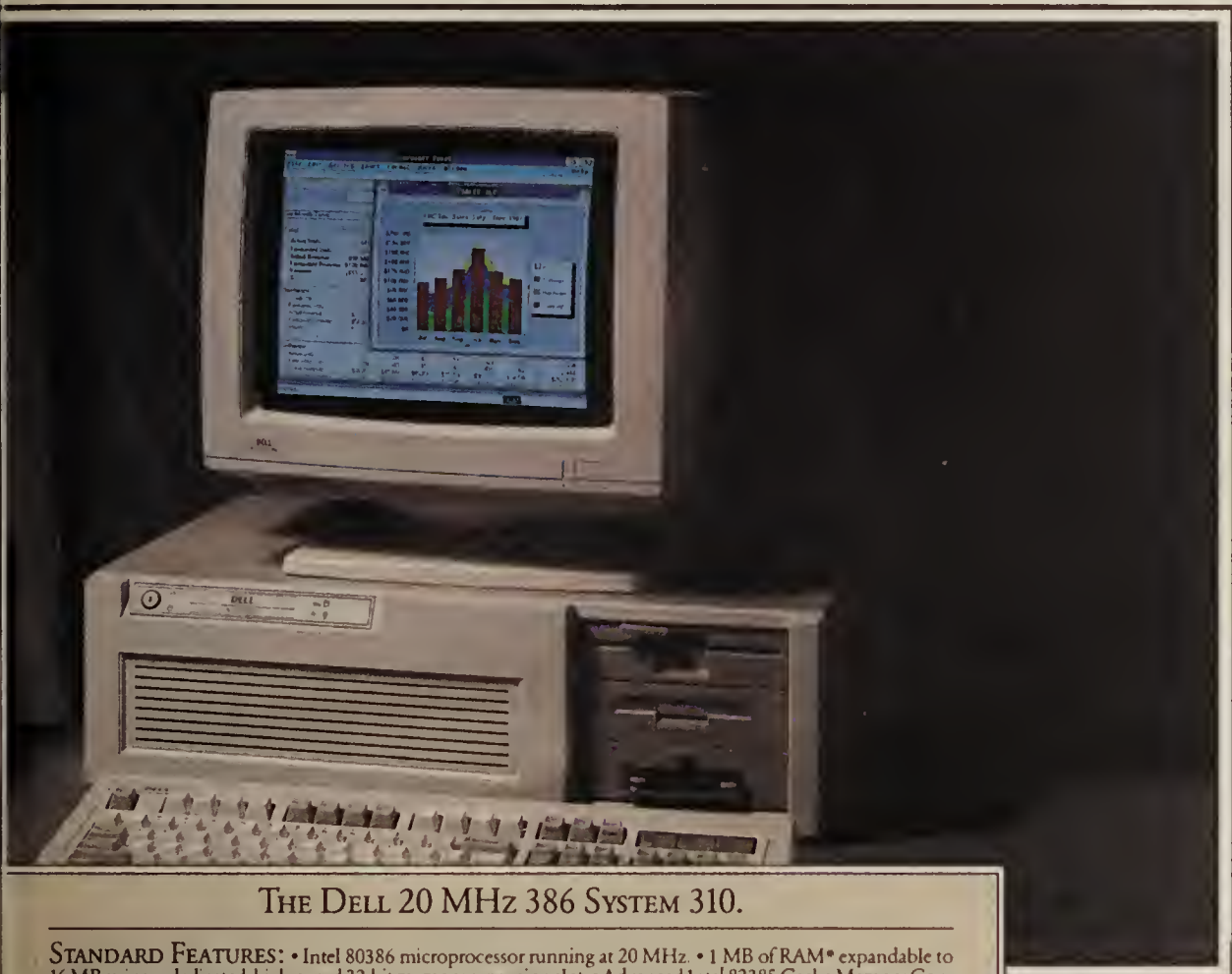
SYSTEM 325 AND 310 OPTIONS: • Intel 80387 math coprocessor: 25 MHz for 325; 20 MHz for 310. • 1 MB or 4 MB memory upgrade kit. • 2 MB or 8 MB memory expansion board kit. • Dell Enhanced Microsoft[®] MS-DOS[®] 3.3. • Dell Enhanced

But speed isn't the only reason to buy from Dell. Or even the best.

THE FIRST PERSONAL COMPUTER THAT'S TRULY PERSONAL.

When you order from Dell, we custom configure a system to your exact personal specifications. After evaluating your business needs, we will help you select the features that are right for

CONSIDER THE NEW DELL SUSPICIOUSLY LOW PRICES.



THE DELL 20 MHz 386 SYSTEM 310.

STANDARD FEATURES: • Intel 80386 microprocessor running at 20 MHz. • 1 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory expansion slot. • Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache. • Page mode interleaved memory architecture. • VGA systems include a high performance 16-bit video adapter. • Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math coprocessor. • 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive. • Enhanced 101-key keyboard. • 1 parallel and 2 serial ports. • 200-watt power supply. • 8 industry standard expansion slots.

**Lease for as low as \$140/Month.

SYSTEM 310	WITH MONITOR & ADAPTER	
Hard Disk Drives	VGA Mono	VGA Color Plus
40 MB-28 ms	\$3,899	\$4,199
90 MB-18 ms ESDI	\$4,699	\$4,999
150 MB-18 ms ESDI	\$5,199	\$5,499
322 MB-18 ms ESDI	\$7,199	\$7,499

Microsoft MS-DOS 4.0. • Both MS-DOS versions with disk cache and other utilities. • Dell Enhanced MS* OS/2. *640 KB is available for programs and data. The remaining 384 KB is reserved for use by the system to enhance performance.

you. After your system unit is custom built, we burn-in everything to make sure the entire system works perfectly.

TOLL-FREE SUPPORT AND ON-SITE SERVICE INCLUDED IN THE PRICE.

Every Dell system includes a complete set of diagnostic tools. So troubleshooting is easy. In fact,

most problems can be resolved over our toll-free support line. It's staffed by Dell's own expert technicians from 7 AM to 7 PM (CT) every business day.

And if your

TO ORDER, PLEASE CALL
800-426-5150
IN CANADA, CALL 800-387-5752

system requires hands-on service, a technician will be at your location the next business day. At no cost to you.[◇]

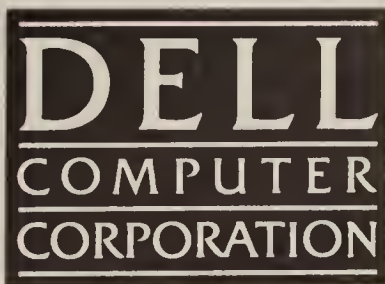
Included in the price of your system is a full year of on-site service.

But that's not all. You're also protected by our 30-day money-back guarantee. And our one-year limited warranty on parts and workmanship.[△]

AND IF YOU STILL THINK YOU GET WHAT YOU PAY FOR, CONSIDER THIS.

When you buy from Dell, you buy directly from our manufacturing facility in Austin, Texas. Which means we eliminate dealer markups, allowing us to give you a lot more 386 for less. We can even design a custom lease plan for your business, which gives you another way to save.

So go beyond your suspicions. Call us at (800) 426-5150 and order the system that's right for you.



Misunderstood and maligned, RDBMSs fight a bum rap

BY FABIAN PASCAL

Twenty years after the relational approach to database management was devised, myths and misconceptions are still circulating about what the term really means and what the approach really accomplishes. What follows is an itemization and refutation of a few of the more common misapprehensions regarding relational database management systems. Most of the erroneous statements are actually extracts from what has been said in the press, not merely personal interpretations.

MYTH: On the personal computer, relational means multiframe. It is a commonly held belief that relational should be defined differently for PC users than for those working in the minicomputer and mainframe worlds.

REALITY: In fact, the relational approach is a universal data foundation, independent of computing platform. Attaching a different meaning to it for the PC is not only a throwback to machine-dependent DBMSs, from which we are desperately trying to escape, but also "multiframe" is dead wrong.

Furthermore, there is nothing relational about connecting multiple files by writing procedural code with loops. This extra work is exactly what the relational multitable operators relieve users from, and those operators should lie at the heart of relational database management anywhere. When they are not part of the relational definition, it becomes useless.

MYTH: The relational approach is too theoretical. SQL can be particularly recalcitrant, the reasoning goes, so users must have a thorough understanding of mathematical sets.

REALITY: This is nonsense. If anybody needs to understand set theory, it is the vendors and for the precise purpose of providing underlying DBMS functions that simplify matters for users and enhance their power. Users need to understand only their data, tables and the logical operations available for them. That is about as unreasonable an expectation as saying that someone who is going to perform an accounting application ought to know arithmetic.

MYTH: The relational approach is too difficult. In long form, the objection usually is that SQL is quite straightforward for simple data access but is more difficult for expressing complex relationships.

REALITY: In principle, this is true of any language. In practice, it is certainly less true of SQL than of most programming languages. As a relational language, SQL was designed — albeit, imperfectly — for the precise purpose of simplifying the expression of complex relationships. Try expressing SQL joins or divisions in your favorite programming language, and it will quickly become apparent which approach is actually more difficult.

MYTH: SQL is only useful for con-

nectivity. If users have no need to deal with a remote host on a daily basis, especially if the host's database is nonrelational, non-SQL programs will do nicely.

REALITY: This misconception stems from a narrow perception of SQL as just a standard interplatform connectivity language. It completely ignores the usability and productivity benefits of the relational

features supported by SQL for any DBMS, whether stand-alone or networked.

MYTH: SQL offers nothing new. The argument here is that the basic SQL commands are remarkably like procedural syntax and are used in the same way. An SQL command, it is said, is a tiny program that opens the database and indexes and deletes the records. The procedural syntax just uses separate commands for those steps and is, in effect, a kind of optimized query.

REALITY: To begin with, SQL is not a program in any sense. A single SQL statement of what result is needed can hardly be compared to the separate commands required to form a step-by-step procedure of how the system should obtain the

result. Moreover, the programming code that is avoided across the board through SQL support is anything but tiny.

Another critical issue ignored here is system optimization. A relational DBMS handles optimization itself. Programs created for procedural DBMSs burden the user with it.

MYTH: The relational approach emphasizes the wrong things. Instead of being preoccupied with SQL and other relatively obscure database technologies, the next generation of database products needs to deliver powerful features, such as custom menus and data entry screens that nonprogrammers can readily understand and use.

REALITY: The powerful features that are usually mentioned as more suitable

DB2 Administrators Takes the Right

With the *right* combination of DB2 products you would have the ability to easily and quickly manage the major aspects of DB2—administration, reorganization and DASD compression. The *right* combination would provide standard user interfaces, integrated function and common logs. Access from one product to the next would be given at the logical point where that functionality is required. The *right* combination would provide benefits and features unique to each product and as a series would provide a pool of benefits and features unsurpassed in performance.

To get the right combination, you could try endless mixtures of various vendors' software and in-house programs, or you could install BMC Software's comprehensive line of DB2 products. BMC Software—The Complete DB2 Company™

BMC Software's 30-Day-Plus Free Trial

For more information or to begin a 30-Day-Plus Free Trial of any or all of these products, simply complete and return this coupon, or call BMC Software, Inc.

In the U.S. and Canada: **1-800-841-2031**

In Texas, call collect: 713-240-8800
France (16-1) 48 77 77 77
Italy (02) 48193845
Japan (03) 837-8651
United Kingdom (0276) 24622
West Germany (069) 664060

**BMC
SOFTWARE**

BMC Software, Inc. • P.O. Box 2002 • Sugar Land, TX 77487-2002

Please contact me about the following:

- | Free Trial | More Info |
|--------------------------|---|
| ☐ | ☐ DB2 CATALOG MANAGER |
| ☐ | ☐ DB2 DASD MANAGER |
| ☐ | ☐ DB2 ALTER |
| ☐ | ☐ DB2 REORG PLUS |
| ☐ | ☐ DATA PACKER™/DB2 |
| ☐ | ☐ All BMC DB2 products |

Name _____

Title _____

Company _____

Address _____

City _____ State/Prov. _____ Zip/P.C. _____

Phone _____

CW

DB2 CATALOG MANAGER provides the ability to quickly and easily manage DB2 catalog information even with little previous knowledge of DB2 or SQL. DB2 CATALOG MANAGER saves the costs of developing and maintaining in-house catalog tools through its comprehensive functionality, which includes automatically printed descriptions of objects and dependencies. Adjustments to the test system catalog can be made quickly, without writing a line of code.

DB2 DASD MANAGER is a capacity planning/performance tuning product for managing DB2 physical objects. It estimates DASD space and selects volumes, and through its space utilization functions, eliminates unused DASD space. Comprehensive and unique space management statistics are provided. In addition, it saves time by automatic generation of utility jobstreams, VSAM commands and object cross reference.

DB2 ALTER automatically restores data, dependencies and authorizations and allows easy change, copy and migration of all attributes of DB2 data structures. DB2 ALTER executes global changes with one simple command and it duplicates objects. These functions and others significantly reduce your workload, eliminate costly user coding errors, improve system availability, and allow frequent changes.

DB2 REORG PLUS reorganizes DB2 data bases twice as fast as the supplied DB2 utility while maximizing DB2 data base efficiency. DB2 REORG PLUS improves performance and lowers costs by reducing CPU cycles and EXCPs. It also takes advantage of multiple CPUs, multitasking and parallel processing. In addition, DB2 REORG PLUS produces comprehensive space management statistics with each reorganization.

DATA PACKER™/DB2 reduces DASD requirements for DB2 tables 30 to 70 percent. Utilizing BMC's exclusive Extended Compression Architecture™ (XCA™), it provides multiple compression techniques, both user selected and automatic. Data Packer™/DB2 offers the ability to perform an online trial compression on an uncompressed data base and to confirm the actual amount of compression on a data base that has already been compressed. Current compression statistics for individual tables are supplied online and in batch.

© 1989, BMC Software, Inc. All rights reserved.

Pascal is a Washington, D.C., consultant and author specializing in relational database management and SQL on the personal computer. He is affiliated with Codd and Date International.

for attention than relational technology are not database functions but user front ends that must tap relational functions in the DBMS back end. Menus and forms need some underlying database technology or else they cannot work. And it is relational features that enhance the power and usability of such tools.

MYTH: SQL is hard to learn and use. Inexperienced users must be trained to use SQL directly and are likely to be less productive.

REALITY: There are three problems with this reasoning. First, it assumes that SQL is difficult for all users and all purposes. There is ample evidence that this is not true, even for end users. Second, it is simply not true that users must learn SQL syntax. Any relational DBMS can insulate

users from SQL syntax. Most do, and those that do not have only themselves to blame. Third, SQL is not less productive than programming, nor are the tools built on top of procedural engines.

Without a proper understanding of what relational really means, how loyal SQL is to it and what its genuine practical implications are, users will not be able to see through these misconceptions and are likely to fall prey to them.

Therefore, users should educate themselves to use the precise relational features and fidelity rules as the correct criteria. If they do, they can properly evaluate, select and use DBMS products and be able to decide what tools to demand from vendors in order to achieve maximum usability and productivity. •

Machine niche tightens

BY MARK BREIBART

Database machines are like specialty players on a basketball team — they play well in certain spots but are only called on for unique situations.

These specialized combinations of hardware and software dedicated to database activities were never intended to replace database management systems that run on general-purpose computers. But

Breibart is a Fluegelman intern for *Computerworld Focus on Integration*.

for large database applications that call for frequent relational joins, they have been able to claim their share of wins over the years, based on cost and efficiency.

Now however, some of the more aggressive vendors of relational DBMS products are challenging the database machines on their own turf, and analysts say the specialists will have to struggle to hold their places on the court.

The two major database machine providers, Sharebase from Britton Lee, Inc. in Los Gatos, Calif., and Teradata Corp. in Los Angeles, aim at different market segments and use different hardware architectures, but they claim similar advantages for their systems. These systems are not inexpensive — a midrange Server/700 configuration from Sharebase costs around \$300,000, and a Model 2 system from Teradata with 22 processors goes for around \$1.2 million.

But for the jobs they are good at, say users and analysts, such systems can cost less than the alternative of combining RDBMS software with general-purpose computers. Performance is greater, they claim, because machine vendors are able to optimize both hardware and software for a single purpose — handling relational database activity for multiple users.

On the up-and-up

These and other factors convinced the Chicago Board Options Exchange (CBOE) that it needed a database machine to handle a decision support system, which required large databases. The CBOE's main business — the activity on the floor of the exchange — is all handled on several IBM mainframes running under TFP and MVS. But for a secondary application, checking the trading for violations of securities rules, Teradata's DBC/1012 machine fit the bill. "We knew we had to store large amounts of data without compromising the CPU cycles of our MVS production machine," says Jane Reinke, the board's director of data resource management.

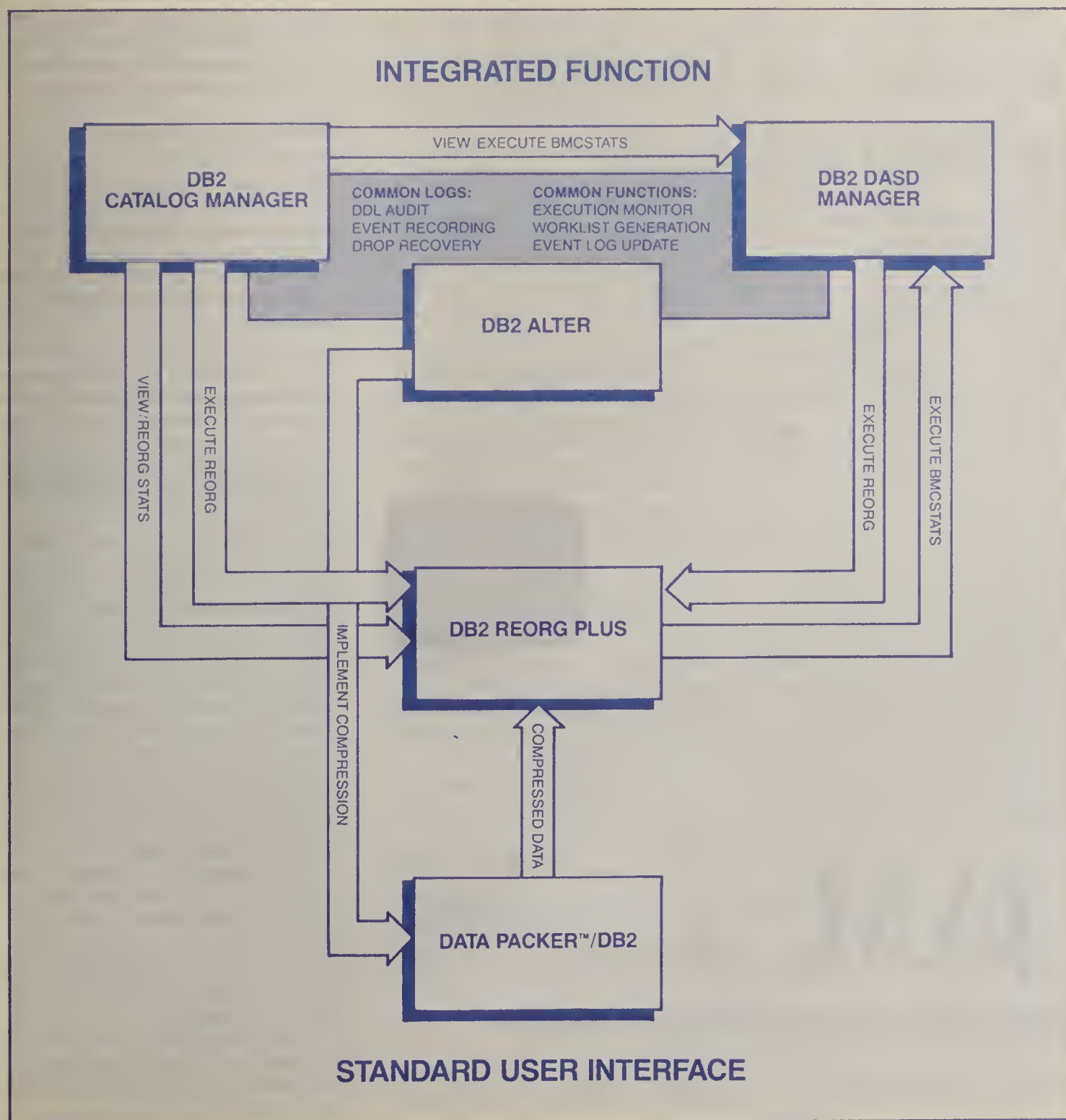
Policing trades requires nightly updates of data from many sources and then batch reports and ad hoc queries on relational database tables as large as five million rows. The Teradata machine's parallel processor architecture is particularly adept at this kind of chore, analysts say, because it can handle massive updates and full database scans by breaking tasks into smaller pieces and managing them concurrently on different processors.

To handle that load as efficiently with RDBMS software running on a general-purpose machine, Reinke estimates the CBOE would have had to upgrade its IBM to something like a 3090 Model 600. That option, she says, was just not palatable. "We were not interested in buying a CPU that large just to dedicate 50% of it to a database."

For Mervyn's, a Hayward, Calif.-based department store chain, the selling point was price. It put a Teradata behind its IBM 3081 and 3090 early last year to handle two inventory and financial systems. Teradata was about 2½ times less expensive than doing it with DB2, says Jerry Wilson, director of information and

Continued on the next page

ation Combination



Machine niche

FROM PREVIOUS PAGE

administration. "We would have had to add to the 3081 and probably evolve to a 3090, but [millions of instructions per second] on the Teradata are cheaper than MIPS on the mainframe."

Sharebase machines have also been known to save an attention-grabbing amount. When Don Wyner, vice-president at Credit Lyonnais in New York, chose a Britton Lee IDM 500 database machine in 1985, he was developing a system to give commercial lending officers and other officials at the bank's U.S. offices on-line access to all customer banking data. Although he was already plan-

SOME OF THE more aggressive vendors of relational DBMS products are challenging the database machines on their own turf, and analysts say the specialists will have to struggle to hold their places on the court.

ning to buy a Digital Equipment Corp. VAX for other applications, Wyner calculated that to match the performance of the Britton Lee product, he would need to buy at least \$400,000 worth of VAX hardware — double what the database machine then cost.

Despite these kinds of benefits, database machines have never claimed more than a corner of the DBMS arena. In a

market that Teradata's Barnes estimates at \$8 billion to \$9 billion, his company's revenue amounted to only \$120 million for 1988. Sharebase, with an installed base of 1,000 systems, had even less revenue for 1988 — \$30 million.

Now, especially for Sharebase, which targets its systems at the department level, software companies are providing stiff competition. Greg Olson, marketing vice-

president at Sharebase, concedes the market is getting rougher. "Back in 1981," he says, "we had a sheer performance advantage, particularly if you had a really hard problem in a mini environment. It's not so obvious anymore."

Sybase, for example, some of whose founders came from Britton Lee, has implemented a client/server architecture in software that matches up quite well against its rival, says analyst Jeff Tash, president of Database Decisions, Inc., a division of Hewitt Associates in Chicago.

The impact of the challenge from Sybase is already evident in at least one way. Late last year, Britton Lee changed its name to Sharebase to try to shift the emphasis from performance to the machine's ability to act as a centralized server for a variety of platforms, Olson says.

On the whole, Teradata has fared better than Sharebase, thanks in part to its parallel processor architecture. Not only does that increase the machine's speed for jobs that can be divided up, but it gives Teradata an element of modularity — users can increase the power of their current machines simply by adding processors, up to a maximum of about 1,000.

Also, Teradata's processors use industry-standard chips from Intel Corp.: the 80286 for its Model 2 and the 80386 microprocessor for its Model 3. That keeps Teradata's hardware development costs down and makes it privy to the ever-increasing power of those chips. Sharebase, by contrast, has to provide its own improvements to its proprietary hardware.

Nevertheless, Teradata is also now getting a run for its money. Its systems, now installed at 140 sites, are aimed directly at potential customers for IBM's DB2 relational database software.

Waiting in the wings

Teradata is not the only vendor of relational technology hoping to steal a slice of the mainframe RDBMS market, however. Companies such as Oracle Corp., Relational Technology, Inc., Software AG of North America and Tandem Computers, Inc. have all developed improved products, according to analysts, as has IBM with DB2. And, notes San Jose, Calif.-based consultant Colin White, as companies like Pyramid Technology, Inc. and Sequent Computer Systems, Inc. go to parallel processors using cheap microprocessor MIPS, Teradata's advantages will shrink. Still, White adds, the competition has a way to go.

Bell Atlantic Corp.'s marketing division in Madison, N.J., reached the same conclusion in mid-1986 when it chose a Teradata system over DB2 to handle a database of its 1.3 million telephone business customers. The group wanted to put in one location all the customer marketing data, which was then spread throughout the firm on a variety of production systems running on IBM, Honeywell, Inc. and DEC equipment. The goal was to provide an on-line decision support system that would let the marketing staff look at any slice of the customer base.

DB2 was already running on the division's IBM 3081. But, according to Ed Moschetti, the division's information systems manager, when the Teradata outperformed DB2 by a margin of 7-to-1 on some prototypical benchmark queries, the choice was clear.

For potential users, the issue may no longer be so clear-cut, and database machines may have to work harder to stay in the game. •



How to match the best front end with the best back end.

You've invested in the best hardware, operating system and database products. You have a staff of programmers ready to go. But to build great looking applications with the sophisticated features today's users demand, you need a powerful front end development tool—JAM.™

JAM, the most advanced user interface management system on the market, does it all—from prototyping to implementation. And, because it works with any database

or file manager, you get the best front end and the best back end.

JAM is hardware independent, so it isn't limited to one computer, database or operating system. In fact, JAM runs on everything from PC's to super-minis, works under 7 operating systems and provides access to a host of database products. Using JAM you can create a consistent user interface across multiple systems and hardware platforms.

JAM works under the following operating systems:

- UNIX®
- VMS®
- RMX™
- MS-DOS®
- XENIX®
- VOS™
- AOS/VST™

JAM makes it easier than ever to design and revise complex applications. Using features like context-sensitive help, procedural command language (JPL), shifting and scrolling fields, extensive data validations, on-line testing, and a variety of visual attributes, you'll be amazed how quickly your applications spring to life.

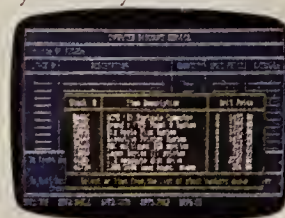
JAM is fast, as well as flexible. Development time is reduced significantly thanks to JAM's powerful screen drawing utilities and comprehensive library of subroutines. You can easily create and link together screens, windows, and menus to develop an application shell. Then simply attach the processing routines, and your application is complete.

Plus, if your back end is an SQL-compatible relational database like Oracle®, SQLbase®, Informix® or Britton Lee,™ you'll really appreciate JAM/DBi, JAM's optional database interface. With JAM/DBi, you can develop entire applications using only industry-standard SQL statements and JAM's authoring tools.

So if you're programming in a 3GL like C or FORTRAN, follow the lead of the many Fortune 1000 companies who have already discovered JAM.

JAM from JYACC. It gives you the best at both ends.

Call for more information about JAM and our demo diskette. **800-458-3313**
JYACC, Inc.
116 John Street
New York, NY 10038
212-267-7722 FAX No. 212-608-6753



Use SQL to retrieve and display data.

JAM

JYACC Application Manager. *The Composer for Sophisticated Applications.*

Before you make the switch ...

BY ROBERT GILMORE

In planning the transition to relational database technology, MIS managers need to give careful thought to structuring the operating environment to maximize use of the new technology.

A first step in making the transition is to optimize the use of the existing environment prior to installing the relational product. Relational database systems require significant processing resources. Rather than face immediate capacity problems, assemble the best individuals available and optimize both on-line and batch environments before implementing your first production relational system.

Both the operations and capacity planning groups must be involved up front with the implementation. Traditionally, these are the last groups to become involved, and they do not appreciate surprises in terms of DBMS and application resource consumption. Anticipate what a relational DBMS is going to do to your operating system environment and plan a strategy to accommodate the growth.

Next, identify the system administration function that will be responsible for the testing, implementation and control of the relational environment. This group should oversee the standards, policies and procedures needed to manage the transition. It should ensure that resources are properly utilized and that database/data communications activity can be accurately monitored and measured.

Consider isolating decision support systems (DSS) from production, or response-sensitive, applications. As the number of users increases, the data manipulation capabilities associated with complex ad hoc requests will cause degradation of the production system if both are running in the same address space or under the same copy of the software.

Learn the relational product's capabilities and limitations. Be prepared to implement centralized control over the production environment and distributed control over the DSS and test environments. Remember, once control is lost — or if it is

never achieved — it is, in most cases, unreasonable to expect that it will ever be properly established.

Data conversion issues

To actually build the environment, much consideration must be given to data conversion. This is never a job that takes the time anticipated — instead, count on at least five times longer than expected.

Ideally, a task force or project team should address the following tasks related

to data conversion:

- Identify the data elements to support the project or projects being migrated.
- Identify the source of the data and the data's owners. Establishing ownership is important — this is where parameters for the validity of the data are determined.
- Spend time up front to identify valid ranges of data and values, where appropriate, so that adequate edit rules can be applied as the data is being loaded into the new environment. Moving "dirty" data from one environment to a new one makes no sense.
- Identify what data will reside in each environment (production or DSS) and what data will be shared or duplicated.
- Identify all internal and external audit requirements for the data. Doing so will

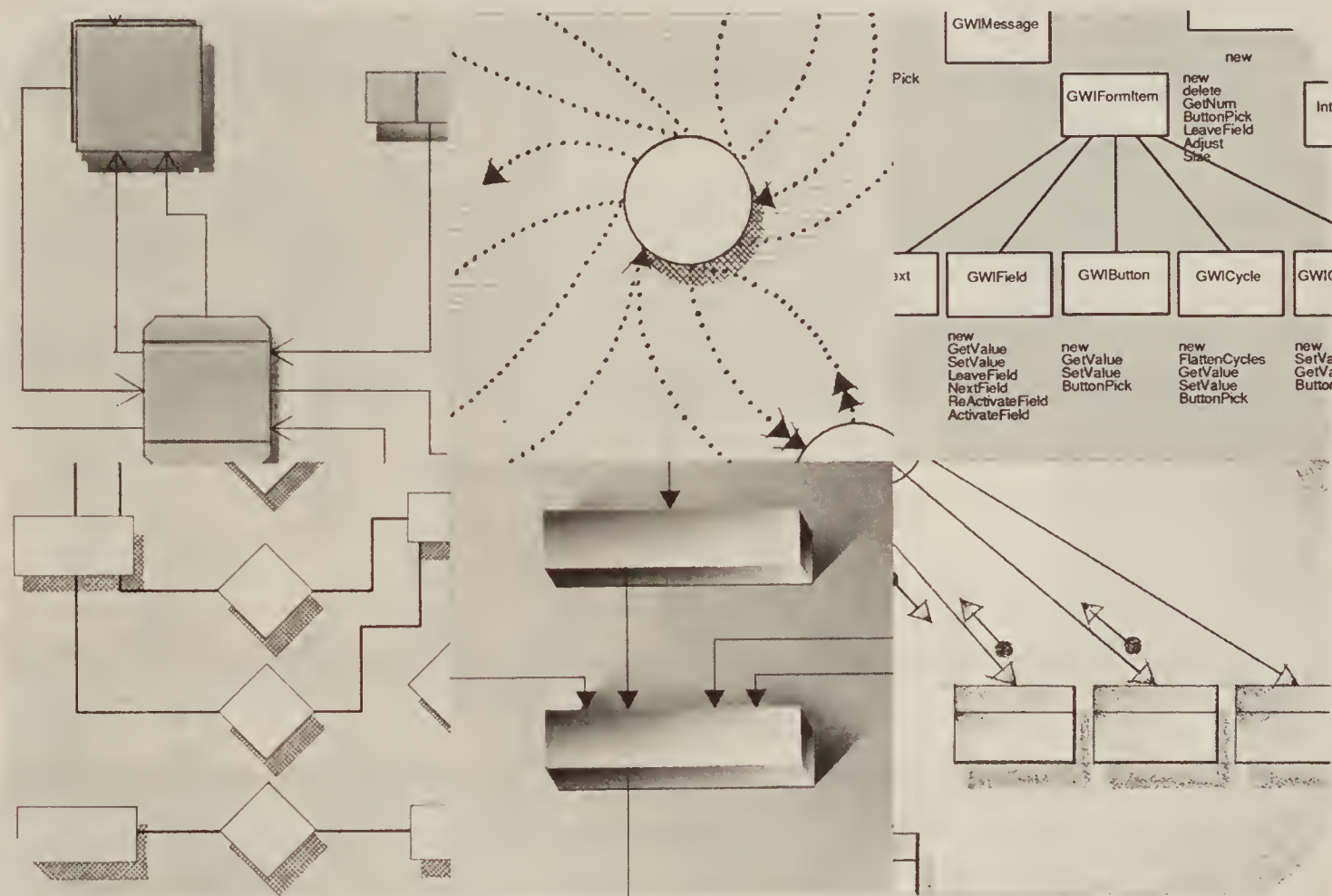
allow you to build audit procedures or identify alternate processing solutions.

Relational technology gives MIS personnel the opportunity to become involved in critical design tasks such as logical design and normalization. It also provides an opportunity to use the phases associated with a system development methodology as the discipline for completing these tasks.

Organizations can now place more emphasis where it belongs — on the data. While the transition may not be a simple process, it does not have to be painful. •

Gilmore is vice-president of Consultingplus Services, a management consulting service offered by Data Base Management, Inc. in Manchester, Conn.

Now you don't have to settle for someone else's idea of CASE. (Even ours.)



Because SYLVA Software Development Tools from CADWARE bring you the flexible solution.

When it comes to software development for your business, you're the expert. So why struggle to make someone else's automated tools replace the techniques that work best for you.

Automate development of your strategic systems.

SYLVA System Developer has all the tools you need to make analysis, design and prototyping efficient and easier to control. Including:

- a powerful rule-based editor that keeps your team on track and evaluates logic
- interactive screen prototyping
- code generation for screen handling and dialog control
- a team-level data dictionary that serves all members of the team simultaneously
- a documentation tool that integrates design diagrams and word processor text

And later, when you discover changes in standard techniques that will further improve development in your

unique environment, System Developer (like all SYLVA development tools) can change right along with you. So your investment in CASE technology — software and training — will always be working for you.

Create your own CASE tools.

SYLVA Foundry is the first and only technology powerful and flexible enough to let you make your own CASE environment. Using Foundry, you can automate your own unique methods, and integrate the methods and tools you already use. And the CASE tools you create will always fit your business needs.

SYLVA development tools from CADWARE. The only CASE solution that can evolve to meet your changing needs. Without outgrowing what you've already paid for. For details on our 30-day money-back trial, call us at 1-800-CADWARE (in CT 1-203-387-1853).



CADWARE. Develop systems the best way — your way.

CADWARE, Inc., 50 Fitch Street, New Haven, CT 06515

ASK THE VENDOR

When using Global Software, Inc.'s Silas, I am required to document DB2 tables or SQL tables. When will it be possible to just document the tables and generate DB2 and SQL code?

*David Jenkins
Technical Officer
First National Bank of Chicago
Chicago*

GLOBAL SOFTWARE, INC.: It is true that DB2 and SQL/DS must be documented separately in the dictionary using Silas. However, there no longer appears to be any valid reason for this separation. We have therefore decided to enhance Silas so that either DB2 or SQL/DS syntax may be generated from a single definition in the dictionary. We anticipate that this enhancement will be available to users by the middle of 1989.

Mainframe and mini RDBMSs

COMPANY	PRODUCT	OPERATING SYSTEM(S) SUPPORTED	QUERY LANGUAGE SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	CONTROLS WHAT TYPES OF ACCESS AND TO WHAT DATA LEVELS?	PERMITS RECORD LOCKING WHILE READING DATA	SUPPORTS POINT-IN-TIME RECOVERY	OTHER BACKUP AND RECOVERY CAPABILITIES	DATABASE ADMINISTRATOR UTILITIES	INTERNAL APPLICATION DEVELOPMENT TOOLS	DATABASE REMAINS AVAILABLE DURING UTILITY OPERATIONS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	SUPPORTS DATA COMPACTION	PRICE
Advanced Microsolutions, Inc. (415) 365-9880	DBMagic	HP 9000 proprietary	SQL	ANSI	Yes	Retrieve data to individual data element, insert/delete to record level, updates to individual data element or entire database	Yes	No	Interactive backup/recovery, database restructure, pack database tables	None	Windows-based user interface, report generator, technical analysis modules	Yes	No	Yes	Yes	\$1,495 (license)
	DBMagic	Rocky Mountain Basic	SWL	ANSI	No	NP	NP	NP	Rollback	None	None	NP	No	No	NP	NP
Amperif Corp. (818) 998-7666	RDM/2 Database Management System	Unix, VOS, AOS/VS, AEGIS, VMS, Ultrix, Xenix, OSX, VM/CMS*	SQL, Proprietary (RQL)	ANSI	No	Retrieve, update, insert, delete to data-item level	No	Yes	Tape and disk with datasave	Database dump and load, user ID	Cobol, Fortran, Mapper, C	Yes	Yes	Yes	Yes	\$145,000 to \$518,500
Britton Lee, Inc. (408) 378-7000	Sharebase I	VMS, VM/CMS, BSD, Ultrix, Unix, Aegis/Domain, Pyramid OSX*	SQL, Quel	ANSI	Yes	Retrieve, update, insert, delete to table, record, column levels	No	Yes	On-line database backup, transaction dump; roll forward	Mirrored disks, performance tuning, database checking	Runtime libraries for Cobol, Fortran, C, Focus, Smartstar, Freeform, JYACC, Accent R	Yes	No	No	Yes	\$20,000 to \$80,000
	Sharebase II	VMS, VM/CMS, BSD, Ultrix, Unix, Aegis/Domain, Pyramid OSX*	SQL, Quel	ANSI	Yes	Retrieve, update, insert, delete to table, record, column levels	No	Yes	On-line database backup, transaction dump; roll forward	Mirrored disks, performance tuning, database checking	Runtime libraries for Cobol, Fortran, C, Focus, Smartstar, Freeform, JYACC, Accent R	Yes	No	No	Yes	\$95,000 to \$125,000
Bull H.N. Information Systems, Inc. (602) 862-8000	Interel	GCOS 8	SQL, FormsSQL, PC/SQL Link, Magna 8, PCF8	ANSI	Yes	Select, update, delete and insert to column/row level	Yes	Yes	Access controlled tables and indexes, mirroring, recovery and restart	Update statistics, model generator, bulk loader, debugging, model report generator, conversion utility, access controller, view generation, user registration, command language facility, transaction execution facility, load/unload	Magna 8 4GL, screen editor, script programmer	Yes	No	Yes	Yes	NP
	Interel Database Computer	GCOS 8	SQL, FormsSQL, PC/SQL Link, Magna 8, PCF8	ANSI	Yes	Select, update, delete and insert to column/row level	Yes	No	Fallback, mirroring	Archive/recovery, statistics, crash dump analyzer, SQL batch	NP	Yes	Yes	Yes	Yes	NP
Campus America, Inc. (615) 523-9506	Poise DMS-Plus	VMS	Query-by-form	NA	Yes	Read, write to database, field levels	No	No	Journaling	Error handling, debugging, runtime libraries, data definition, key assignment, menu/screen designer	Screen-based application specification/maintenance, code generator, report writer	Yes	Yes	Yes	No	\$20,500 to \$29,000
Century Analysis, Inc. (415) 680-7800	CFMS (Central File Management System)	NCR VRX, VRX/E	Proprietary (INTL/6, LOOK/4)	NA	Yes	Retrieve, update, insert, delete to file, record and field levels	Yes	Yes	Roll forward, rollback	Report writer, index key build, library utilities	Screen generator, interactive file maintenance	No	Yes	Yes	NP	\$8,000 to \$40,000
Cincom Systems, Inc. (800) 543-3010	Supra Version 2	MVS/SP, MVS/XA, DOS/VSE, VSE/SP, VM/CMS, VMS, Unix	SQL	ANSI	Yes	Select, insert, update, delete to attribute level	Yes	Yes	Incremental backup, mirroring	Accounting, auditing, data load, data update, data expert	4GL, text processor, report writer, project management, database design	Yes	Yes	Yes	Yes	NP
Cognos (800) 426-4667	Powerhouse Starbase	VMS	SQL, Proprietary	ANSI	Yes	Read, write, control definitions, modify protection, delete definitions at the database, table and column levels	Yes	No	Disk and tape backup with operator-controlled queuing, journaling of multiple databases to the same journal	Dictionary maintenance, reporting, structure validation and repair, structured backup/restore	Powerhouse 4GL, QLI (proprietary)	Yes	Yes	Yes	Yes	\$3,000 to \$300,000
Command Business Systems, Inc. (800) 223-2942 (714) 259-7531 (Calif.)	Structure/4	MVS, Primos*	Proprietary (Cweri)	NA	Yes	Varies; established independently for each program	Yes	Yes	Mirroring, transaction logging	Edit/change documentation	4GL; screen, forms drivers; file creation/conversion; report, screen, data maintenance generators	Yes	No	No	Yes	\$950 to \$26,500
Compuserve Data Technologies (617) 661-9440	System 1032 4GL/DBMS	VMS	Proprietary (System 1032 4GL)	NA	Yes	Retrieve, update, insert, delete at table, column, row or field levels	Yes	Yes	Journaling, rollback	Performance monitoring, tuning	System 1032 Application Facility	Yes	Yes	Yes	Yes	\$3,000 to \$180,000

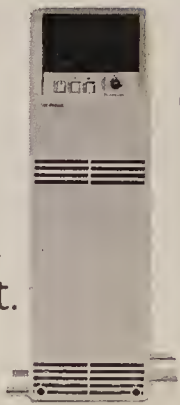
*Also supports microcomputer operating systems

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

**ARE
YOU READY
TO ASSUME A
POSITION
OF POWER?**

Now you can turn any desktop into a seat of ultimate power. With the UNIX[®] based PRIME EXL[™] Series and SCORE[™]. Solutions for the Coordinated Resource Environment.

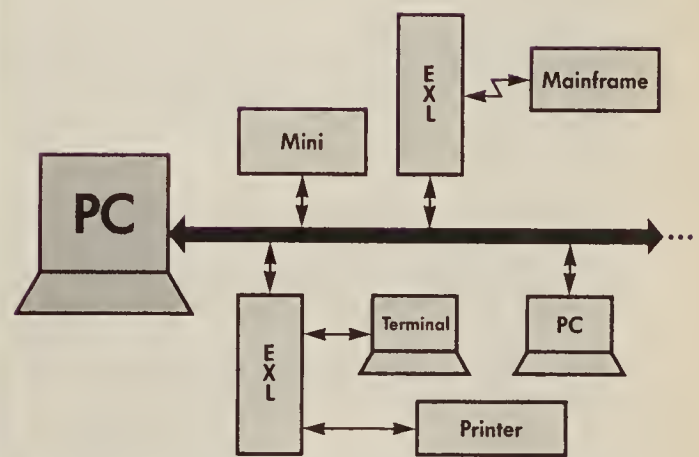
It's Prime's commitment to putting the capabilities of all your



computer resources right where they belong. At your fingertips.

So you can get information from the mainframe. Develop applications. Send data. Share information and software. And do your job. All from one position of power.

Consider SCORE and the PRIME EXL Series—a family of multi-user, multi-tasking systems based on AT&T's UNIX V. 3.1 and Intel386[™] technology. Solutions powerful enough to tie PCs, printers, peripherals, and other users together in a multi-vendor



SCORE—a total solution for integrating corporate computing resources at the desktop and departmental level. By providing a shared computing resource pool, productivity is increased.

environment. PRIME EXL can manage everyone's files. Connect to other departments with industry standard communications like Ethernet™, TCP/IP, and SNA. And handle your UNIX, DOS®, or PICK® applications simultaneously. SCORE and the PRIME EXL Series.

At long last there's a way to merge desktop capabilities with the corporate computing environment. Find out more about SCORE and the PRIME EXL Series by calling us at 1-800-343-2540 (In Canada, 1-800-268-4700). Prime. Once we put you in a

position of power, there's no limit to what you can do.

Prime
Prime Computer, Inc.

PRIME and the Prime logo are registered trademarks, and PRIME EXL and SCORE are trademarks of Prime Computer, Inc., Natick, MA. Intel8086 is a trademark of Intel Corporation. UNIX is a registered trademark of AT&T. DOS is a registered trademark of Microsoft, Corp. PICK is a registered trademark of Pick Systems. Ethernet is a trademark of the Xerox Corp.

COMPANY	PRODUCT	OPERATING SYSTEM(S) SUPPORTED	QUERY LANGUAGE SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	CONTROLS WHAT TYPES OF ACCESS AND TO WHAT DATA LEVELS?	PERMITS RECORD LOCKING WHILE READING DATA	SUPPORTS POINT-IN-TIME RECOVERY	OTHER BACKUP AND RECOVERY CAPABILITIES	DATABASE ADMINISTRATOR UTILITIES	INTERNAL APPLICATION DEVELOPMENT TOOLS	DATABASE REMAINS AVAILABLE DURING UTILITY OPERATIONS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	SUPPORTS DATA COMPACTION	PRICE
Computer Associates International, Inc. (800) 237-9273	CA-Universe	MVS, MVS/XA, VSE, VSE/SP, VM, VM/XA	Quel, SQL	Proprietary	Yes	Retrieve, update, insert, delete to data value within column	Yes	No	Database export/recovery log, restart utility	DASD storage maintenance, database controller monitoring and restructuring, user permissions, index population analysis, audit trails	4GL	Yes	Yes	Yes	No	NP
	CA-Datcom/DB	ESA, MVS, MVS/XA, VSE, VSE/SP, VM	Proprietary, SQL	ANSI	Yes	Same as above	Yes	Yes	Checkpointing, logging, restart recovery, backward/forward recovery	Accounting database maintenance, dictionary backup, directory maintenance	Proprietary	Yes	Yes	Yes	Yes	NP
Computer Corporation of America (617) 492-8860	Model 204	VSE/SP, MVS/XA, VM/SP	Proprietary (Imagine)	ANSI (in development)	Yes	Retrieve, update, insert, delete to record, field, file levels	Yes	Yes	Rollback, roll forward, media recovery, transaction backout, journaling, on-line backup	File loading, field-level security, reorganization, dictionary reporting, on-line database modification	Painter, on-line testing, prototyping, 4GL, editors	Yes	Yes	Yes	Yes	\$35,000 to \$300,000
Concept Omega, Thoroughbred Division (201) 560-1377	Thoroughbred Idol-IV	Unix, Xenix, VMS, Thoroughbred/OS*	Proprietary	NP	Yes	Retrieve, update, insert, delete to record, field and file levels	Yes	No	None	Library comparisons, printer terminal tables, operator logins, dictionary backup/restore	Product is 4GL	Yes	No	No	Yes	\$895 to \$15,495
Conceptual Software, Inc. (800) 782-8969	Prodax Version 3.2	Xenix*	None	NA	No	Retrieve, update, insert, delete	No	Yes	None	Reindex, import/export	QED editor	No	No	No	No	\$720
Concurrent Computer Corp. (201) 758-7000	Reliance Plus	OS/32-Proprietary	Proprietary (Reliance Access)	NA	Yes	Retrieve, update, insert, delete to data element level	Yes	Yes	Roll forward and backward	Database monitor and simulator, transaction monitoring, programmer productivity tools	Reliance Builder-4GL	Yes	Yes	Yes	Yes	\$6,900 to \$38,810
Coyne Kalajian, Inc. (703) 522-7026	ResponseR	Wang VS	SQL	ANSI	Yes	Retrieve, update, insert, delete, global modify, global delete to all levels	Yes	Yes	NP	Validate database, search and remove damaged records	AWP, application developer, custom report writer	Yes	Yes	Yes	Yes	\$33,000 to \$49,000
CRI, Inc. (408) 980-9898	Relate/DB	MPE, MPE/XL; VMS; VM; PC/DOS; Domain, Aegis*	Proprietary (Relate)	NA	Yes	Retrieve, update, insert, delete to field, record and file levels	No	No	Roll forward	NP	4GL, report writer	Partially	Yes	Yes	Yes	NP
Cullinet Software, Inc. (800) 551-4555	Enterprise; DB	VMS, Unix	SQL	ANSI	Yes	Retrieve to field, record and file levels	Yes	Yes	Archive recovery	Database system, performance monitors	Enterprise Builder, Enterprise Generator, Enterprise Expert	Yes	Yes	Yes	No	\$4,500 to \$223,000
Data Access Corp. (305) 238-0012	Dataflex 2.36	VMS, Unix, Xenix, CP/M; 3Com 3+; Novell Netware; Vines	Proprietary	NA	Yes	None	Yes	No	Power fail protection	Reindex, file maintenance	Report/application generator	No	Yes	Yes	No	\$695 and up
Data General Corp. (508) 366-8911	DG/SQL	AOS/VS, AOS/VS II	SQL	ANSI	Yes	Retrieve, update, insert, delete	Yes	No	Transaction base, rollback, roll forward	Data dictionary	Cognos Powerhouse, DG/Ingres	No	Yes	No	No	\$460 to \$11,165 (runtime), \$1,740 to \$42,050 (development)
Digital Equipment Corp. (508) 897-5111	VAX RDB/VMS	VMS	SQL, RDML	ANSI	Yes	Retrieve, update, insert, delete to table, row and column levels	Yes	Yes	On/off-line backup, autorecovery	Export/import to transfer, restructure or rebuild database; performance monitoring; analysis	SQL precompiler, language processor, other proprietary tools	Yes	Yes	Yes	Yes	\$2,250 to \$60,000
Empress Software, Inc. (301) 220-1919	Empress	Unix, VMS*	SQL	ANSI	Yes	Retrieve, update, insert, delete to field, record, column levels	Yes	Yes	Warm restart, import/export	Indexing, locking, security, audit trails	4GL (M-Builder)	No	Yes	Yes	No	\$1,200 to \$100,000
Exact Systems and Programming Corp. (914) 285-9444	DNA-4	AOS/VS, AOS, RDOS	Proprietary	NA	Yes	Retrieve, update, insert, delete	Yes	No	Transaction logging	Define logical files, maintain data dictionary	4GL	Yes	Yes	Yes	Yes	\$1,250 to \$36,000
General Data Systems (215) 985-1780	GDX	MVS, Tandem Guardian	Query-by-forms, proprietary (GDX)	Proprietary	Yes	Retrieve, update, insert to field level	Yes	Yes	Before/after looks, auto/manual shutdown/recovery, record transaction level recovery	Built-in audits, performance analysis	Screen painter, code generator, prototyper, report writer, source management	Yes	Yes	Yes	Yes	\$95,000 to \$180,000
Gupta Technologies, Inc. (800) 876-3267	The SQL System	MVS*	SQL	DB2 compatible	Yes	Retrieve, update, insert, delete to table, column levels	Yes	Yes	Application programming interface for managing remote sites	SQL Talk/Windows	SQL Windows (proprietary)	Yes	Yes	Yes	Yes	\$1,295 and up
Henco Software, Inc. (617) 890-8670	Info-DB+	VMS	Proprietary (IQL)	NA	Yes	Retrieve, update, insert, delete, item level	Yes	Yes	None	None	Forms generator, report writer, 4GL	Yes	Yes	Yes	No	\$7,500 to \$165,000
Hewlett-Packard Co. (800) 752-0900	Allbase/SQL	MPE XL, HP UX	SQL	ANSI	No	None	No	No	Automatic rollback, roll forward	NP	4GL, query facility	Yes	No	No	No	\$3,500 to \$36,750
IBM Contact local IBM sales office	DB2	MVS/ESA, MVS/XA, VSE Advanced Edition Function	SQL, query by example	ANSI, SAA	Yes	Access control to field, file, record levels	Yes	Yes	Dual logging, on-line database and log archiving, incremental image copy, two-phase commit, warm restart	On-line load/unload, DB2 catalog statistics update, accounting, performance monitoring, record editor	4GL, application generator, application directory, report writing, graphics, editing	Yes	Yes	Yes	Yes	\$3,060 to \$4,140/month
	SQL/DS	VM/IS, VM/SP, VSE/Advanced Function, VM/XA	SQL, query by example	ANSI, SAA	Yes	Access control to field, file, record levels	Yes	Yes	On-line database log, archives, warm restart, two-phase commit, rollback	Data load/unload, reorganization, statistics, accounting, security audits, record editing	4GL, application directory, report writing, query, graphics, editing	Yes	Yes	Yes	Yes	\$761/month
	Application System/400	OS/400	AS/400 Query, SQL, menu-based natural query language	IBM SAA	Yes	Field- and row-sensitive security through column value	Yes	Yes	Rollback, journaling, auto system resynchronization, checksum, save/restore	Handled by the operating system	Program development manager, data file list utility, source entry utility, screen definition, screen format generator, character generator	Yes	No	No	No	Integrated in OS/400 operating system

COMPANY	PRODUCT	OPERATING SYSTEM(S) SUPPORTED	QUERY LANGUAGE SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	CONTROLS WHAT TYPES OF ACCESS AND TO WHAT DATA LEVELS?	PERMITS RECORD LOCKING WHILE READING DATA	SUPPORTS POINT-IN-TIME RECOVERY	OTHER BACKUP AND RECOVERY CAPABILITIES	DATABASE ADMINISTRATOR UTILITIES	INTERNAL APPLICATION DEVELOPMENT TOOLS	DATABASE REMAINS AVAILABLE DURING UTILITY OPERATIONS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	SUPPORTS DATA COMPACTION	PRICE
Information Builders, Inc. (212) 736-4433	Focus	VM, MVS, Unix, VMS, Wang VS, Guardian 90, HP-UX, HP/MPE XL	SQL	ANSI	Yes	Retrieve, update, insert, delete to field level	No	No	Absolute file integrity	Access command control, encryption, password assignment, display control	Applications generator	No	Yes	Yes	No	\$77,000 and up
Information Dimensions, Inc. (800) 328-2648 (614) 761-7300 (Ohio)	DM	VMS, NOS/VSE	Proprietary	NA	Yes	Retrieve, update, modify, delete to field level	Yes	Yes	Rollback	Query facility, report writer	Fortran, Cobol, data dictionary, screen painter	Yes	Yes	Yes	Yes	\$8,000 to \$115,878
	Basis	VMS, MVS/TSO, VM, VS, NOS/VE, Ultrix	Proprietary	NA	No	Access code at database record, field levels	Yes	No	None	Performance monitoring, sorting, batch input	Report defining and executing, menu-driven application creation, thesaurus, database definition	No	No	No	Yes	\$8,000 to \$44,700
Information Structures, Inc. (303) 293-2911	Base/OE	VMS	Proprietary	NA	Yes	Retrieve, update	Yes	No	None	None	Development language	No	No	No	Yes	\$10,000 to \$40,000
Informix Software, Inc. (415) 322-4100	Informix-Turbo	Unix	SQL	ANSI	Yes	Retrieve, update to column level, insert/delete to row level	Yes	No	Archive/restore; roll forward, checkpoint recovery	Performance monitoring, tuning	None	Yes	No	No	Yes	\$895 to \$79,300
	Informix-4GL	Unix, Xenix	SQL	ANSI	Yes	Retrieve, update to column level, insert/delete to row level	Yes	No	Audit trails, transaction logging	B Checks	Product is 4GL	Yes	No	No	Yes	\$1,495 to \$190,000
	Informix-4GL Rapid Development System	Unix, Xenix	SQL	ANSI	Yes	Retrieve, update to column level, insert/delete to row level	Yes	No	Audit trails, transaction logging	B Checks	Informix 4GL, Informix SQL, ESQ/C, ESQ/Cobol, ESQ/Ada	Yes	No	No	Yes	\$1,495 to \$190,000
	Informix-4GL Interactive Debugger	Unix, Xenix	SQL	ANSI	Yes	Retrieve, update to column level, insert/delete to row level	Yes	No	Audit trails, transaction logging	B Checks	Same as above	NP	No	No	Yes	\$995 to \$126,700
	Informix-SQL	Unix, Xenix, VMS	SQL	ANSI	Yes	Retrieve, update to column level, insert/delete to row level	Yes	No	Audit trails, transaction logging	B Checks	Same as above	Yes	No	No	Yes	\$1,195 to \$105,700
Intelligent Information Systems, Inc. (516) 328-7000	Destiny	VMS	Proprietary	NA	Yes	Retrieve, update, insert, delete to data and file levels	Yes	Yes	Roll forward, transaction processing with rollback	Dump/restore and transfer of selected field data between files	Interactive editor, define/modify screen and report forms, debugger	Yes	Yes	Yes	Yes	\$3,100 to \$78,000
Interactive Software Systems, Inc. (303) 987-1001	UDMS	VMS	Proprietary	NA	Yes	NA	Yes	Yes	None	Dictionary, extracts, imports, interface to other RDBMSs	4GL	No	Yes	Yes	Yes	\$7,000 to \$21,000
Interactive Technology, Inc. (503) 644-0111	RDM: The Application Developer	VMS, Xenix, RSX, RSTS, MicroRSX, TSX*	Query-by-form/process	NA	Yes	Retrieve, update, insert, delete to all levels	Yes	No	NP	Control table listings	Form, process generators, report writer, menu builder, file utilities	Yes	No	No	No	\$895 to \$89,995
Interbase Software Corp. (617) 275-3222	Interbase	VMS, Sun, Apollo, Ultrix	SQL, Proprietary (GDML)	ANSI	Yes	Read, write to field level	Yes	No	On-line backup, after-image journaling, restore	Fix and clean-up	Interactive query languages	Yes	Yes	Yes	Yes	\$5,000 to \$75,000
Intersystems Corp. (617) 621-0600	M/SQL	VMS, AOS/VS, VM, Unix, Xenix*	SQL	ANSI	Yes	Retrieve, update, insert, delete at field level	Yes	Yes	Transaction rollback, incremental backup	Window Manager, report writer	Interactive query generator, menu generator	Yes	Yes	Yes	No	\$95 to \$119,000
Jaybe Software (602) 327-2299	Cdb Toolkit	Unix	Query by example	NA	Yes	Retrieve, update, insert, delete	Yes	Yes	Transaction logging, roll forward	Index generation, label generation, database editors, change record/field	Product is application generator	Yes	Yes	Yes	No	\$495 and up (per CPU)
Landmark Software Systems, Inc. (201) 722-5100	Xample	VMS	Proprietary	NA	Yes	Retrieve, update, insert, delete	Yes	Yes	None	None	Menu handler; formulas; rules; screen, report generators	Yes	Yes	Yes	Yes	\$20,000 to \$10,000
MAI Basic Four, Inc. (714) 731-5100	MAI Origin ADS	BOS/VS, BOS/IX	Executive Query Manager	NA	Yes	Retrieve, update, insert, delete to all levels	Yes	Yes	Log book; incremental, image backup	Presentation services, integrated data dictionary	Application generator, report program generator, presentation services	Yes	No	No	No	\$1,495 to \$5,995
MDBS, Inc. (800) 344-5832	Knowledgeman/2	VMS	SQL	ANSI	Yes	Retrieve, update, insert, delete	No	No	None	None	4GL	No	Yes	Yes	No	\$3,995 and up
	MDBS III	Unix, VMS	SQL	ANSI	Yes	Retrieve, update, insert, delete	Yes	Yes	Transaction logging, rollback recovery	Database area and user maintenance, verify physical integrity, compacted database backup	4GL, forms painter	Yes	Yes	Yes	Yes	\$15,900 and up
Must Software International (800) 441-6878	Nomad	VM/XA/CMS, MVS/XA	Native reporting facility (LIST)	NA	Yes	Retrieve, update to column level, insert, delete to table level	Yes	Yes	NP	Application performance analyzer	Menu-assisted front end for database definition, building maintenance, reporting, screen generator	Yes	Yes	Yes	No	\$30,000 to \$195,000
National Information Systems, Inc. (408) 985-7100	Accent R	VMS	SQL, query by form	ANSI	Yes	Retrieve, update, insert, delete	Yes	Yes	VMS utility	Security, catalog, version upgrade utility, program modification	Manager's guide, report generator, screen generator, applications integrator	Yes	Yes	Yes	Yes	\$4,620 to \$227,780
Odesta Corp. (800) 323-5423	Helix VMX	VMS*	Query by form	NA	Yes	Retrieve, update, insert, delete	Yes	Yes	Autosave	Database administrator, update collection, collection handler	Object oriented, icon-driven	No	Yes	Yes	No	\$4,500
On-Line Software International, Inc. (800) 642-0177	Ramis Information System	MVS, MVS/XA, VM, DOS/VSE, OS, VSE/SP	Proprietary, SQL	ANSI	Yes	Retrieve, update, insert, delete to field, table, record levels	Yes	No	Backup and reload database with one-word commands	NP	Menu-assisted workbench, automatic menu-based application generator	Yes	No	Yes	No	\$19,000 to \$126,000
Oracle Corp. (800) 345-3267	Oracle	MVS, VM, VSE	SQL	ANSI	Yes	Retrieve, update, insert, delete to column level	Yes	Yes	On-line backup	Unload, reload, on-line monitor	SQL forms; Cobol, PL/I, Fortran, C precompilers	Yes	R&D	R&D	Yes	\$20,000 to \$200,000
Prime Computer, Inc. (508) 655-8000	Prime Oracle	Primos, Unix	SQL	ANSI	Yes	All procedural languages	Yes	Yes	Roll forward, batch backup	None	SQL*Forms (Oracle)	No	No	No	No	\$5,000 to \$110,000
	Prime Information	Primos, Unix*	Proprietary (Inform)	NA	Yes	All procedural languages	Yes	Yes	Roll forward, batch backup	On-line file administration	Code generator, 4GL, PROC languages, debugger, screen editor, custom report designer	NP	Yes	Yes	No	\$495 to \$35,000

COMPANY	PRODUCT	OPERATING SYSTEM(S) SUPPORTED	QUERY LANGUAGE SUPPORTED	VERSION OF SQL	INCLUDES DATA DICTIONARY	CONTROLS WHAT TYPES OF ACCESS AND TO WHAT DATA LEVELS?	PERMITS RECORD LOCKING WHILE READING DATA	SUPPORTS POINT-IN-TIME RECOVERY	OTHER BACKUP AND RECOVERY CAPABILITIES	DATABASE ADMINISTRATOR UTILITIES	INTERNAL APPLICATION DEVELOPMENT TOOLS	DATABASE REMAINS AVAILABLE DURING UTILITY OPERATIONS	OFFERS ENTITY RELATIONSHIP INTEGRITY	OFFERS DOMAIN INTEGRITY	SUPPORTS DATA COMPACTION	PRICE
Progress Software Corp. (617) 275-4500	Progress	Unix, Xenix, Ultrix, AIX, A/UX, VMS, CTOS/BTOS	Proprietary, SQL	ANSI	Yes	Read and write to field level, read/write/delete to file level	Yes	Yes	Before image and roll forward, incremental backup	Database analysis, index rebuild	Proprietary application builder	No	No	Yes	Yes	\$1,000 to \$154,000
Quodata Corp. (203) 728-6777	QDMS-R	RSTS/E, VMS	Proprietary	NA	Yes	Retrieve, update, insert, delete to field level	Yes	No	NP	Reorder database	4GL, 3GL	Yes	No	Yes	No	\$12,000 to \$27,000
Recital Corp. (508) 750-1066	Recital	VMS, Unix	Dbase, SQL, Proprietary	ANSI	Yes	Retrieve, update, insert, delete to all levels	Yes	No	Journaling	None	4GL, Dbase, screen painter, report writer, label generator	Yes	Yes	Yes	Yes	\$4,500 to \$45,000
Relational Technology, Inc. (800) 446-4737	Ingres	VMS, Ultrix, Unix, VM/CMS, MVS*	SQL, Quel	ANSI	Yes	Retrieve, update, insert, delete to all levels	Yes	Yes	Journaling	Performance tuning, copy database objects	4GL, 3GL, screen painter, report writer	Yes	Yes	Yes	Yes	\$5,000 to \$180,000
Resolve Logic Systems (416) 366-6844	Resolve Productivity Set	Unix	ADL	NP	Yes	Retrieve, update, insert, delete to all levels	Yes	Yes	NP	NP	Forms generator, report writer, code generator	Yes	Yes	Yes	Yes	NP
RIM Technology, Inc. (206) 451-8144	RTIRIM	COS, NOS, NOS/VE, VM/CMS, AOS/VS, VMS, Unix, Ultrix, Primos, Aegis*	Proprietary	NA	Yes	Read, write, modify, to file, record levels	Yes	No	None	Remove users, set user access levels, recover deleted file space and rows, repair damaged file structures	Application interface	No	Yes	Yes	No	\$800 to \$14,500
Ruf Corp. (913) 782-8544	Information Management Processing and Reporting System	VMS	Proprietary	NA	Yes	Retrieve, update, delete, insert to field level	Yes	No	Transaction logging	Join, merge, restructure files; delete records, columns; reformat data; add indexes; decision support tools	Data manipulation language, forms editor	Yes	No	Yes	Yes	\$6,000 to \$20,000
The Small Computer Company, Inc. (914) 769-3160	Filepro Plus 3.0	Unix, Ultrix, VMS	Proprietary (FPSQL)	NA	Yes	NP	Yes	No	None	None	NA (this product is an application development tool)	Yes	No	No	No	\$3,990 and up
Smith, Abbott & Co. (202) 223-4990	Autopro	RSTS/E, VMS, Novell Netware, all 3Com networks	Query by form	NA	Yes	Retrieve, update, insert, delete to field level	Yes	No	Audit trails, change logging	Field creation/deletion, database add/delete/modify, report writer	Screen, menu generators	Yes	Yes	Yes	Yes	NP
Software AG of North America, Inc. (703) 391-6614	Adabas	MVS, MVS/XA, MVS/ESA, VMS, DOS/VSE, VM/CMS, Wang VS	SQL	Proprietary	Yes	Retrieve, update, insert, delete to value level	NP	Yes	Restore, walk forward, walk backward with recovery logs	Table load/unload, security definitions, table deletes, create/delete index, database reports	Data dictionary, 4GL, 3GL, CASE, code generator	Yes	Yes	Yes	Yes	\$10,000 to \$231,000
Stratus Computer, Inc. (508) 460-2000	SQL/200 Relational Database Management System	Stratus VOS	SQL, VQL	ANSI	Yes	Retrieve, update, insert, delete to all levels	Yes	Yes	On-line backup, modular units of recovery	Bulk load, bulk unload, dynamic updates to dictionary	4GL, compilers	Yes	Yes	Yes	Yes	\$14,000 and up
Sun Microsystems, Inc. (415) 960-1300	Sun Unify	Unix	SQL	ANSI	Yes	NP	NP	NP	Backup, rollforward recovery	Table statistics, schema access, specify disk layout	NP	NP	No	Yes	NP	NP
	Sun Ingres	Unix	SQL, proprietary	ANSI	Yes	NP	NP	NP	Roll backward, roll forward	Backup to disk or tape, journaling, restore database after hard/soft crashes, modify database, copy database	Applications by form, C, Fortran	NP	No	Yes	NP	NP
Sybase, Inc. (415) 548-4500	Sybase SQL Server	Unix, Ultrix, VMS, AIX, Stratus VOS	SQL	ANSI	Yes	Retrieve, update, insert to data level	Yes	Yes	On-line backup, maintenance, diagnostics; physical logging; disk mirroring for transaction logging	On-line database design changes, integrity changes, configuration management	APT Workbench	Yes	Yes	Yes	Yes	\$10,000 to \$100,00
Tandem Computers, Inc. (408) 725-6000	Nonstop SQL	Guardian 90	SQL	ANSI	Yes	Retrieve, update, insert, delete, access to field level	Yes	Yes	Transaction monitoring, roll forward, rollback	Explain query, plan explanation, update statistics	Pathmaker	Yes	No	Yes	Yes	\$300 to \$500 (per month per processor)
Unify Corp. (800) 248-6439	Accell/SQL for Unify 2000	Unix, Xenix	SQL	ANSI	Yes	Retrieve, update, insert, delete to data item level	Yes	Yes	On-line backup, automatic recovery	NP	Application generator, 4GL	Yes	Yes	Yes	No	\$2,995 to \$120,000
Unisys Corp. (313) 972-7000	InfoExec Series Semantic Information Manager	MCP/AS	Proprietary	NA	Yes	Retrieve, insert, delete, update at class, entity and relationship levels	Yes	Yes	Dual auditing, synchronized recovery, rollback/restart, off/on-line database backup	Advanced Data Dictionary System; Operations Control Manager; DB Analyzer, Monitor, Certification	Screen Design Facility, Interactive Query Facility, Workstation Query Facility, Cobol, Pascal, Algol	Yes	Yes	Yes	Yes	\$9,295 to \$166,000
	UDS RDMS 1100	OS 1100	SQL	ANSI	Yes	File, field, record levels; views controlled for all functions	Yes	Yes	Short recovery with use of audit trails, medium recovery from audit trail, long recovery from last database dump, selective recovery on portions of database	Statistics and performance analysis, automated application recovery, dynamic/static dump, fast load, on-line duplexed file leg reconstruction	SQL integrated with Cobol, Fortran, Pascal, C compilers, Mapper/Link 4GL products, IPF	Yes	Yes	Yes	Yes	\$32,599 to \$90,841
Vista Computers, Inc. (914) 332-9174	Datascan	AOS/VS	Mumps	NA	Yes	Retrieve, update, insert, delete	Yes	Yes	Journaling	None	Program/report generator	Yes	Yes	Yes	Yes	\$15,000 and up
Wang Laboratories, Inc. (508) 459-5000	Pace	VS/OS	Proprietary (Pace/Query, HLI)	Proprietary	Yes	Retrieve, update, insert, delete to record level	Yes	Yes	Rollback, rollforward, transaction backout	Automated application, builder host language, integrated graphics, spreadsheet reporting	NP	NP	Yes	Yes	Yes	\$10,000 to \$39,000

JAD platform plus CASE tools automate early collection of user expertise

87

tools introduces a design discipline that is difficult to match by any manual approach. In fact, AJAD can reduce development time by as much as half, compared with traditional systems design methods.

Getting started

The following critical questions must be addressed by the IS manager in charge of the AJAD program:

- What tools should be used?
- Which project should be the pilot?
- Who's on the AJAD team?

When addressing the tool question, many IS organizations will of course be inclined to use the CASE tools they already own. That is fine, as long as the tools can graphically depict data and process models, paint screens and generate reports. But many tools cannot.

If the current tool set does not cut the mustard, IS should consider acquiring some new ones before embarking on AJAD.

Among others, tools such as Index Technology Corp.'s Excelerator and Texas Instruments, Inc.'s Information Engineering Facility make fine AJAD aids because their personal computer-based graphics components allow users to quickly define and modify systems specifications

without having to consult a mainframe repository.

Once the tools are in place, the IS manager should get together with a user manager to define a viable pilot project. As with any pilot, it is wise to choose a project that is off the critical path, one that can be developed quickly and has a relatively low possibility of failure. Operational systems such as payroll, accounts payable and order entry are preferable to strategic systems such as advanced stock market analysis, expert underwriting or computer-integrated manufacturing.

An IS manager can minimize the risk of AJAD failure by selecting a project that his development staff is familiar with or even one they may have programmed before.

The AJAD team

There are six main members of a typical AJAD team: the executive sponsor, IS manager, AJAD facilitator, AJAD scribe, IS developers and end users.

- The **executive sponsor** is a senior-level manager from the user firm — often the manager who helped choose the pilot project — who can ensure the level of commitment needed to make the AJAD project a success.

- The **IS manager** spearheads

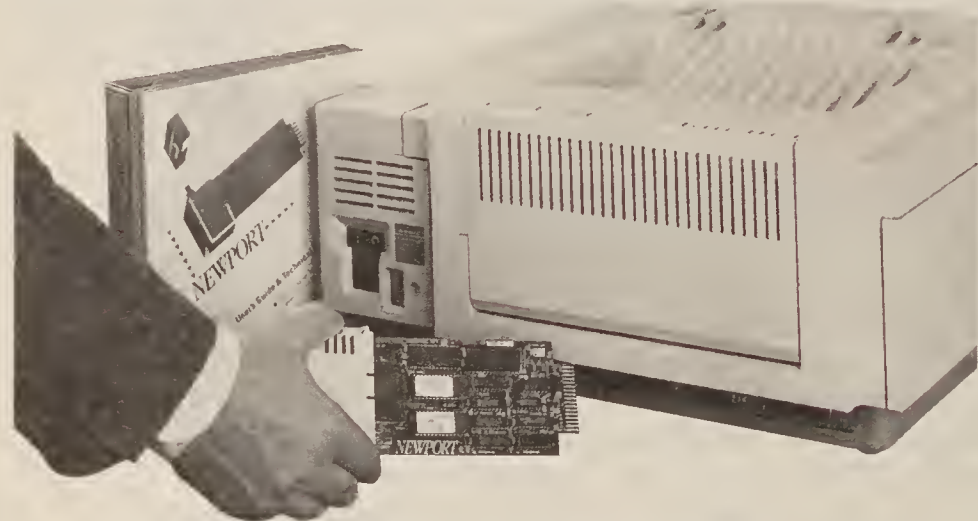
A sample AJAD session

In this AJAD meeting at an insurance company, a facilitator drives the discussion with the user, the IS staff interprets it, and a scribe uses CASE technology to document and project the system design

Facilitator and user conversation	IS staff interpretation	Scribe's data model
F: Can a client own more than one policy? U: Yes. F: Do we maintain information about potential clients? U: That's how we stay competitive. F: Do we put policy information in the books before we sell a policy? U: No.	There is a one-to-many relationship between client and policy with an existence dependency that states, "Clients are created before policies."	
F: What other information do we maintain? U: Premium information is important. F: How does that relate to policy administration? U: A policy generates many premiums over the year it is in force. F: Does every policy generate a premium? U: Yes, and it's recorded at the time of sale.	There is a one-to-many relationship between policy and premium with an existence dependency that states, "These records are created at the same time."	
F: What about beneficiaries? U: Yes, we track them as well. We have to know who gets the check. F: Can a client have more than one beneficiary? U: Absolutely.	There is a one-to-many relationship between client and beneficiary with no existence dependency stated.	
U: I'm not sure the design is correct. F: Oh, really? Why? U: We keep track of beneficiaries not by client but by policy. F: Can we have more than one beneficiary per policy? U: Yes.	There is a correction of the model to eliminate the client-to-beneficiary relationship and to create a policy-to-beneficiary relationship (one-to-many). These records are created at the same time.	

CW CHART: JOHN YORK

3287 Desktop Printing From Your Mainframe



...With LaserJet Power

Now you can create great looking LaserJet documents directly from your mainframe with the **NEWPORT/Coax** printer adapter. Merge on-line text, graphics, fonts and letterhead to give your reports and printouts the professional appearance they deserve.

NEWPORT fits right into the optional I/O slot in the LaserJet II or IID printer. Simply attach a standard 3270 Type A coax and press the "Optional I/O" button. You're ready to print directly from your mainframe. The serial and parallel ports of the printer are left available for connection to personal computers and other devices.

NEWPORT was co-developed with Hewlett-Packard to ensure maximum compatibility. In addition to 3287 emulation, the **NEWPORT**-LaserJet combination gives you features you can't get from a 3287 printer.

NEWPORT is completely host configurable and compatible with your IBM supplied host software. Graphics are available through GDDM, user-developed programs, and a variety of third party host application software including TELLGRAFF, MD-LASER, MD-GRAFT and SAS/Graph.

For Your Evaluation Unit
Call 1-800-633-9299

During Business Hours, 8-5 CST

Andrew will provide a **NEWPORT** to qualified buyers for a 30 day evaluation. At the end of the evaluation period, you may purchase the **NEWPORT** for \$895, or return the unit at no charge.

NEWPORT was designed by Local Data. With more than a decade of experience with IBM interfaces and protocols, Local Data is now an Andrew Company dedicated to providing leading edge communications technology.

ANDREW
Network Products

Midwest Operations Center, CW-NEWPORT
4650 N. Port Washington Rd., Milwaukee, WI 53212

© 1989 Andrew Corporation
LaserJet is a registered trademark of Hewlett-Packard Co.

BACKUP.UNETTM OR LOSE UDATA

BACKUP.UNET — one-stop network backup for multiple UNIX platforms.

BACKUP.UNET, UCONTROL, UBACKUP, USECURE, and UQUEUE — system administration software to better manage your UNIX environment.

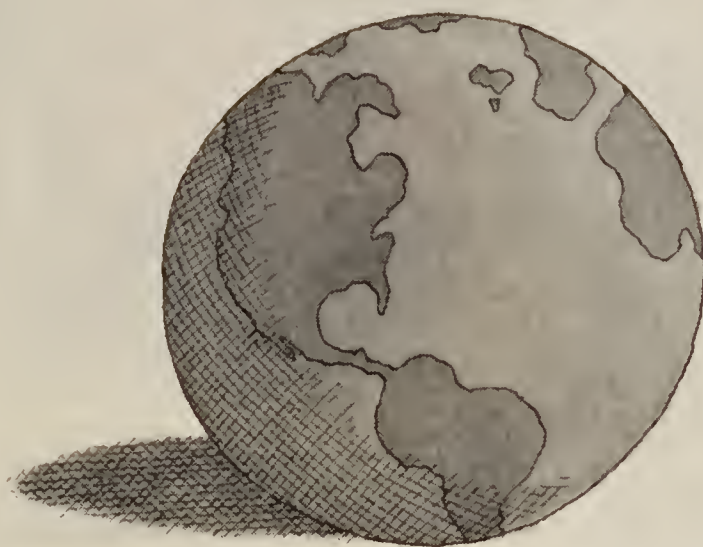
For information, why don't UCALL us at (703) 264-3301.

Visit us at UniForum Booth #1306.

UNITECH
SOFTWARE INC.

Unitech Software, Inc. 1800 Alexander Bell Drive, Suite 101, Reston, VA 22091, Telex 197817 UNITEC UT, Fax (703) 264-7796

*UNIX is a registered trademark of AT&T, UCONTROL, UBACKUP, USECURE and UQUEUE are registered trademarks of UNITECH Software, Inc. BACKUP.UNET is a trademark of UNITECH Software, Inc.



The UNIX Software Operation was created to serve one particularly exclusive market.

As we celebrate 20 years of development, the UNIX® system has become recognized as the standard in operating systems around the world. This is confirmed by a customer list that includes every major system vendor committed to open systems, and even some who are not.

The unique capacity of the UNIX system to satisfy the needs of a range of users has made it a catalyst of the open systems' movement.

Market acceptance of the UNIX system, which was first licensed by AT&T 13 years ago, has been overwhelming. As a result, AT&T created the UNIX Software Operation as a separate business unit to

serve all users of UNIX System V-based products.

It's the latest milestone in the UNIX System V heritage of responding to the marketplace and customers. Key product enhancements are also evidence: Releases 3.0, 3.1, 3.2 delivered networking, internationalization, XENIX®/386, and security features.

The UNIX system's inherent capacity for upward migration assures that ongoing technology of UNIX System V Release 4.0 will be available to all our customers—current and future.

With every enhancement, the UNIX Software Operation will continue to keep UNIX System V

portable, compatible, interoperable, scalable, and standard compliant. All of which will be achieved only through accountability to each and every customer who needs true open systems functionality.

To find out more about UNIX System V and the UNIX Software Operation, call 1 800 828-UNIX.



AT&T

The right choice.

Informix is the #1 And the only

To develop your application faster, you need the only 4GL that doesn't rely on COBOL or C to fill in the missing pieces.

INFORMIX-4GL.

A complete COBOL replacement.

Unlike other DBMS products, INFORMIX-4GL is a complete application development language for SQL databases. It's the only 4GL with full screen-building, report-writing and SQL database I/O capabilities designed into a single programming language. Which means it's a real COBOL-replacement-caliber tool. So you'll rarely have to revert to COBOL or C to customize an application.

**10 times faster than COBOL.
3 times faster than any other 4GL.**

When you leave COBOL and C behind, high productivity kicks in. In fact, with INFORMIX-4GL, you'll be able to deliver even the most complex custom applications at least 10 times



faster than you can with COBOL or C. And 3 times faster than with any other 4GL.

Moreover, application debugging and maintenance are a breeze with our INFORMIX-4GL Interactive Debugger. You can view and debug your 4GL source code while the program runs. Even maintenance time will be reduced drastically.

After all, with the non-procedural syntax there's less code to maintain. And the debugger makes it easy for others to understand and maintain your code.

What's more, our INFORMIX-4GL Rapid Development

*Here's what it takes to make a complete 4GL.
And only Informix has it all.*

- ✓ Complete report-writing screen-building and database I/O language in a single product.
- ✓ Language comprised of non-procedural statements.
- ✓ Language flexibility equal to COBOL or C.
- ✓ Full SQL implementation.
- ✓ Application portability without recompiling*.
- ✓ Complete source code debugger capability.
- ✓ A 10 to 1 increase in developer productivity.

Database in UNIX. Complete 4GL.



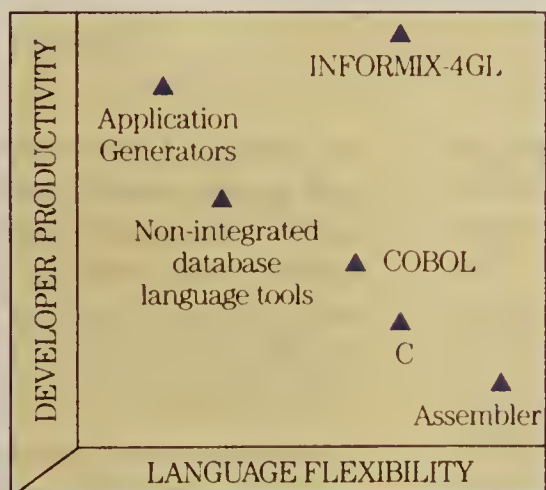
course, most every known version of UNIX. Better yet, it runs on more machines (over 200) from more manufacturers (85) than any other DBMS.

**All that and
a best-seller, too.**

Informix DBMS products for UNIX, including INFORMIX-4GL, outsell their closest competitors

System lets you compile your code in a fraction of the time you'd normally take. And you can port your applications to other operating systems without rewriting or recompiling a single line of 4GL code.*

INFORMIX-4GL is as flexible as conventional languages, but provides all the power of a 4GL with its non-procedural syntax for handling menus, forms, reports and SQL.



INFORMIX-4GL vs.
other application-building tools.

Plus it's more portable.

You can take INFORMIX-4GL just about anywhere—MS-DOS, OS/2, VMS, and, of

by a substantial margin. So if you subscribe to the theory that there is safety in numbers, rest assured. With INFORMIX-4GL, the numbers are on your side.

**Free booklet,
“How To Choose A 4GL.”**

For a free copy of our new guide, “How To Choose A 4GL,” call or write Informix Software, Inc., 4100 Bohannon Drive, Menlo Park, CA 94025. (415) 322-4100.

And solve the 4GL puzzle. Completely.



INFORMIX

#1 for good reason.

*Obviously, mixed 4GL/C programs or code written to take advantage of specific operating system features may need to be rewritten or recompiled.

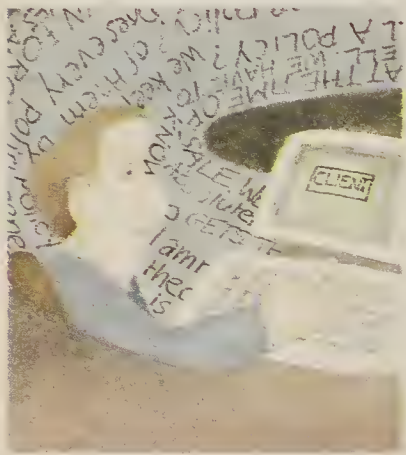
Informix is a registered trademark of Informix Software, Inc. UNIX, MS-DOS, OS/2 and VMS are registered trademarks of their respective manufacturers. © 1988, Informix Software, Inc.

the AJAD movement. This person is responsible for selecting the proper tools and choosing the team to kick off the AJAD effort; he also works with the executive sponsor to select an appropriate pilot project to test the new development approach.

- The **AJAD facilitator** is a user analyst or senior systems analyst who has terrific communication skills, knows the tools, understands project management and has an appreciation for group dynamics. The facilitator is a team builder.

- The **AJAD scribe** is the tools expert. This person is a top-notch systems analyst who knows the tools inside-out. The scribe can transform a user's response to a question into a diagram representing a systems specification.

- **IS developers** are the professionals charged with actually building the system. They are the programmers, analysts and database specialists who need to better understand the user's requirements before creating a



systems implementation.

- Finally, **end users** are the subject matter experts. They know the business better than anyone else. They are the ones that will define the systems specifications and comment on the designs as these elements evolve during the AJAD process.

In addition, many organizations just starting out in CASE or JAD may find it necessary to use consultants on their first AJAD project. Consultants can play active team roles like scribe or facilitator, or they can be used less frequently as advisors or trainers. Either way is acceptable, as long as the consultants possess the necessary expertise and can effectively transfer their skills to the rest of the AJAD team.

There are many sources of good consulting support available in the marketplace. CASE vendors are prime sources of tool training and expertise, while project development and methodology consultants can be sought as JAD advisors and facilitators.

Keep in mind also that you can fly solo after the first success.

The first AJAD session

After the team members are identified and tapped, the IS manager should carefully plan

MANY ORGANIZATIONS use consultants on their first AJAD project. Consultants can play active team roles like scribe or facilitator or can be used less frequently as advisors or trainers.

the first AJAD session. Realizing that commitment is the key to any successful AJAD project, IS should try to boost team morale with a good, strong start.

An executive statement of support is a great way to kick off the project. The executive sponsor should make an appearance at the first AJAD meeting, stat-

ing management's expectations and reinforcing the organization's dedication to the AJAD program.

Because the AJAD process

will end up requiring four hours of work a day, five days a week, the team members should know that they have management's support from the very beginning.

After the executive send-off, the team can begin work. The IS manager first introduces the AJAD facilitator. It is important that the facilitator come well prepared. This person sets the



The networking T1 from the #1 name in network solutions.

Meet Omnimux® 8000. The newest addition to the most complete T1 product line in the industry...a range of solutions that covers everything from channel banks and DACS to the most sophisticated, multi-nodal, networking T1 muxes.

Built with over 30 years of networking knowledge, the mid-range 8000 puts our experience to work for you. To make T1 more like you'd like it to be. More affordable. More reliable. More manageable.



More affordable, because **modular architecture** lets you buy only the features you need. The result: a customized T1 solution just right for your network. And for your budget.

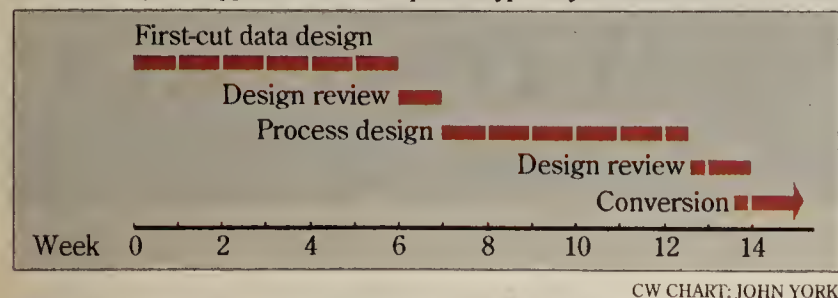
More reliable, because **redundant integral CSUs** — both primary and hot back-up spare for every T1 line — ensure maximum uptime. You don't waste time and money replacing CSUs. You won't lose your diagnostic database either. And you can tell the difference between T1 line and CSU problems faster and easier, too.

More manageable, because instead of the risk of a single point of failure, you get **single point control** of both CSUs and T1 muxes. One menu-driven, integral network management system gives you comprehensive tools to ensure maximum network availability.

Want more? How about bandwidth contention. Bypass, automatic alternate routing, and drop/insert. Versatile data and voice support. And still more. All at a price you're sure to like.

The AJAD life cycle

Automated joint application development typically takes 3 to 4 months



tone for the whole process, reviewing the project's scope, objectives and assumptions with the AJAD team.

For instance, the facilitator should take time at the outset to mention that AJAD is a highly interactive and visual process, one marked by facilitator questions, user reaction and IS interpretation. The scribe translates what is being said into system dia-

grams and prototypes, which are projected onto a screen in the AJAD meeting room. IS developers contribute to the process by raising key design issues and helping the team make appropriate design decisions as the project evolves. The chart on page 88 depicts the evolution of a typical AJAD meeting.

Notice in the chart how the data model evolves as the discus-

sion regarding an insurance application unfolds. The first scenario shows the definition of the client and policy data relationship. The premium entity is added in the second level. The third iteration adds the beneficiary information to the model. The fourth scenario illustrates how easy it is for participants to raise important issues and improve the quality of the design.

This sample session exemplifies the ease with which models can be developed through an AJAD process. It eliminates the cut-and-paste method associated with unautomated development approaches. Plastic templates are replaced by precision design tools such that design in a vacuum makes room for interactive development.

AJAD life cycle

Compared with a JAD procedure without automation, which typically takes six months to a year to complete, an AJAD project typically lasts three to four months (see chart this page). The first six weeks are used to define a first-cut data model. The deliverables include an entity relationship diagram as well as an entity list and attribute definitions. The AJAD team must work diligently in order to complete the models in the six weeks.

Once the first-cut design is complete, the next week is spent reviewing the design with key users — excluding those on the AJAD team — and the executive sponsor.

Objectivity is the reason for not including AJAD team members in the review process. The ego involvement of team participants can sometimes hinder their honest appraisal of the design.

Upon completion of the review, the AJAD team reconvenes and begins work on the processing components of the design. The deliverables of this phase include process hierarchies and dependencies as well as program logic definition.

A finalized design review is conducted by Week 14. Design refinements and executive sponsor sign-off is necessary before

We stand on our record, but never rest on our laurels.

We're working to add leadership in T1 to our history of achievement. And if our track record is any guide, we're the networking company you can count on for quality, reliability, and stability.

Our full T1 line is just part of a comprehensive range of network components that encompasses modems, DSUs, fiberoptic products, statistical multiplexers, data encryption products, X.25 systems, and network management systems.

What's more, we go far beyond hardware and software to provide total customer support in

Building better networks



82 countries...before, during, and after the sale. We can help you plan, design, implement, manage, and maintain any size network, anywhere in the world.

You don't have to take our word for it. For example, Datapro* said, "...a full-service systems supplier...solid products that perform as promised." And IDC** found Racal-Milgo holds the largest share of both domestic and international markets for network management systems. You can expect the same commitment and long-term performance from Omnimux 8000.

For more information, call toll-free 1-800-327-4440 (in Florida, 1-305-476-4811). Federal Government users, 1-800-327-7909 (in Florida, 1-305-476-4452).

Omnimux 8000. Now, that's more like it. But then, that's Racal-Milgo. Reaching beyond today's standards.

*Datapro, *User Ratings of Network Management Systems*, September, 1988.

**International Data Corporation (IDC), *Quantitative Analysis of the Network Management Market*, October, 1988.

Racal-Milgo®
RACAL

© 1989 Racal-Milgo

NEW! NEW! NEW!

ICF Catalog Support!

CMS/MVS Toolkit

Now access JES2 queues, ICF Catalogs and MVS DASD datasets, *directly* from CMS.

(312) 525-6400

ChicagoSoft

738 N. LaSalle St., Chicago, IL 60610

NEW! NEW! NEW!

We make a super VGA monitor



NEC introduces the best VGA monitor you can
buy. MultiSync® 2A.

The first monitor that takes our award-win-
ning multiple frequency technology and cus-

tomizes it to the needs of the VGA user.

MultiSync 2A is both affordable and uncompromised. And
completely compatible with all VGA modes. In short, it performs
brilliantly. But what's equally important, it allows you to move
effortlessly to the next major graphics standard: SuperVGA.

All this in a monitor that gives you a 14" non-glare screen on
a tilt-swivel base, for nearly 30% more viewing area than stan-
dard 12" screens, and a new cabinet that's not only functional but is
designed to look as good from the back as it does from the front.

MultiSync 2A. One super VGA monitor.

VGA mode shown at 320 x 200

Computers and Communications

that's also a SuperVGA monitor.



But that's only part of the story. NEC also introduces the best SuperVGA monitor you can buy. MultiSync® 2A.

The first monitor that takes our award-winning multiple frequency technology and customizes it to the needs of the SuperVGA user. MultiSync 2A senses the software you're using and makes the switch from a VGA monitor to SuperVGA, the new standard developed by NEC and recognized by VESA, the Video Electronics Standards Association. SuperVGA delivers a maximum resolution of 800 x 600, which is 56% higher than VGA.

And since you're most likely buying a board that goes beyond VGA, your monitor should too. For literature call 1-800-826-2255. For technical details call NEC Home Electronics (USA) Inc. at 1-800-FONE-NEC.

MultiSync is a registered trademark of NEC Home Electronics (USA) Inc.

MultiSync 2A. One SuperVGA monitor.

©1989 NEC Home Electronics (USA) Inc.

NEC

the models can be converted into database designs and programs.

Conversion can take weeks or months, depending on the complexity of the designs and the sophistication of the CASE tool. It should be noted that tools providing automatic code and design generation can cut in half the time required to convert even the most challenging projects.

The power of AJAD is

achieved when CASE tools are first used in a scheduled JAD session. This can happen by accident — as when a forward-thinking project manager or programmer/analyst suggests the team consider using a CASE tool in the next JAD session — or by design, as discussed here. Within no time, a development environment is created that combines the quality of user-driven design

with the productivity of automated systems construction.

The AJAD process shifts the burden of proof of systems development away from the IS staff and toward the users, who are ultimately responsible for the operation of the business. AJAD provides a mechanism for users to resolve their conflicts while improving IS' ability to build timely and accurate systems

through the use of rigorous CASE tools.

AJAD is an idea whose time has come. By implementing the approach, IS can combine the quality of user-driven design with the precision of CASE technology to create a highly productive development environment that is capable of delivering the systems that will keep our firms competitive for years to come. •

Project log

Below is a typical automated joint application development (AJAD) project log, which follows the week-by-week AJAD life cycle (see chart page 93):

• **Weeks 1 and 2:** Team building exercises, data modeling training, review of business models and initial data model graphics. No discussion of attributes.

• **Weeks 3 and 4:** Refinement of data models, attribution of entities and initial descriptions of attributes — for example, definitions, field lengths and data types. No discussion of volumes or entity-to-entity ratios.

• **Weeks 5 and 6:** Completion of first-cut data designs, attribution, definitions, volume and ratio estimates as well as a validity check against business models.

• **Week 7:** User reviews of first-cut design, refinement notes and design changes.

• **Weeks 8 and 9:** Process modeling training, review of finalized data design, initial process hierarchy design and process dependency design. No discussion of process logic.

• **Weeks 10 and 11:** Refinement of process hierarchies, process dependencies and initial process logic definition. No discussion of program-run volumes.

• **Weeks 12 and 13:** Completion of procedure designs, including hierarchies, dependencies and process logic; completion of run-volume estimates; and validity check against data design.

• **Week 14:** User reviews of finalized data and process designs, refinement notes and design changes and user sign-off.

• **Weeks 15 and on:** Conversion of data design into database, conversion of process design into programs using high-level language or program generator, screen and report layouts using prototyper, systems testing and turn-over to production.

JAMES M. KERR



Announcing 3090 Central and Expanded Storage from EMC Corporation.

As a 3090 user you now have the choice to make a smart business decision. Our 3090 Central and Expanded Storage upgrades offer you the reliability, performance, local and remote support that you demand at a price 30% lower than that of IBM.

Actually, this good news is old news. For 10 years we have been offering users cost-effective, state-of-the-art storage solutions. Our

strong background in mainframe storage solutions has been recognized by Fortune 500 companies worldwide. These companies have realized that we provide a better business decision for their mainframe storage needs. Now, we have built this mainframe experience into our 3090 product offerings.

For additional good news on how EMC Corporation's 3090 storage upgrades can help

you reach your business objectives call or write: EMC Corporation, Hopkinton, MA 01748-9103 1-800-222-EMC2. (In MA, 508-435-1000.)

EMC² The System Enhancement Company.
IBM is a registered trademark of International Business Machines Corporation.

TAKING CHARGE

William R. Brittain

Our personal perspective

Like our technology, programmers come in generations, each with a set of values and work methods that match the evolution of the industry. The changes reflect not only the state of the information sciences but also larger sociological happenings that shape a generation of people.

I am familiar with three generations: the one ahead of my generation, my own and the one following mine. In each instance, the experiences that shape those working generations occur in the first working years, when the majority of workers are in their 20s.

Power and influences begin to emerge in a generation during their 30s and become consolidated in their 40s and beyond. The incoming generation is the life and energy that pushes the others forward.

The differences

The generation of programmers before mine began in the industry by actually wiring circuit boards and programming on machines that may have had a total random-access memory of 64K bytes for the operating system and all of the business applications that were developed. This generation does not take systems methodologies, programming standards, structured programming theories or systems design theory seriously.

But these programmers always get the job done with at least one or two examples of work that go beyond expectations while letting other areas go along less formally. They invented the notion that programmers do not like documentation. All of the books, theories and new declarations of the advancing information sciences are like new clothes on a child whose birth they attended.

My generation lived through Vietnam, women's liberation, structured programming and the conversion to virtual operating systems and database management technology. Somehow, there is a relationship there, but I am too close to the situation to see it. Perhaps it is that the changes both in our society and in the industry were fundamental.

Continued on page 100

Erbrick delivers for United Parcel Service

BY AMY CORTESE
CW STAFF

PROFILE

Frank Erbrick

PARAMUS, N.J. — Frank Erbrick clowns around, donning a fur hat from China given to him by one of his staff. In it, he looks more like the avid camper he is than the man that manages the information needs of an \$11 billion package delivery service.

As vice-president of information services at United Parcel Service of America, Inc., Erbrick is not your average IS executive. A former butcher, he has been with UPS for 28 years — most of that time in accounting and operations. Like most people at UPS, he spent time driving a delivery truck and has worked his way up the ranks. Described as friendly, outgoing and even "a bit bombastic," Erbrick, 49, is known for always having a humorous story to tell. His office is a place where people at all levels of the company feel comfortable and can frequently be found. Walking through the halls, Erbrick has a hearty greeting or slap on the back for everyone.

Erbrick displays an almost parental concern for his staff and is known to send care packages of food and magazines to his overseas staff in the 42 countries in which UPS now operates. Systems programmer Bryan Hartman, a care package recipient who presented Erbrick with the fur hat upon his return, says Erbrick has always reminded him of his father. "They both have that



ANDY FREEBERG

Position: Vice-president of information services, United Parcel Service of America, Inc.

Mission: To provide information services to bolster the company's expansion while maintaining an atmosphere encouraging worker input at all levels

Perry Mason look," he says.

Erbrick started at UPS as an accounting supervisor, moving on to stints in operations and customer service and most recently as controller for UPS' Pacific region.

In February 1985, Erbrick was assigned to IS, moving back east to take the second-in-com-

mand position at UPS' Paramus, N.J.-based information services division. He was quickly promoted to vice-president of information services in August of that year and assumed responsibility for all computer systems.

Although he admits to not being thrilled with the assignment at the time, Erbrick says having

such a significant impact on UPS and experiencing the "pride of accomplishment" of his staff has made it "the most invigorating experience of my career. Anything I do after this will be anticlimactic."

Acknowledging that he does not have a technical orientation, Erbrick says he believes in delegating authority, letting his staff make the decisions. "People have to know they're allowed to fail," he says. "You have to let people know you have faith in them."

Erbrick's staff says he does not need technical expertise to manage them. "The way he relates to people and can hold attention at a meeting" are more important, Hartman says.

Employee-owned UPS has a strong corporate culture rooted in the ideology of UPS founder James Casey, who strongly believed that the company's greatest asset is its people. This philosophy is reflected in Erbrick's egalitarian management style.

"He's the kind of manager that works hard and sets a good example," says UPS Executive Vice-President Kent "Oz" Nelson, Erbrick's boss. "People relate to him well."

Erbrick has instituted a policy under which everyone, managers and Erbrick included, shares the work on holidays when the pace is stepped up instead of leaving junior employees with long and undesirable shifts. Er-

Continued on page 101

IS looks to user base for consulting services

BY ALAN J. RYAN
CW STAFF

CHICAGO — When it was time for a major systems revamping at the Gas Research Institute (GRI) here, it seemed logical to look to consultants. What some might say was illogical was that those consulted were nearly all GRI employees holding non-IS positions, from clerical workers to vice-presidents.

However, the result is a system that everyone can live with and that many non-IS employees take pride in having helped design, according to director of information systems Hugh Naughton.

GRI went with the nontraditional approach to systems overhaul, which Naughton labeled

"process flow analysis," to get a clear sense of what the users required in a system, not what the systems people thought the users needed. "We talked to people at every level in the company," he said.

Company specs

Gas Research Institute performs research and development for the natural gas industry, from producers that extract the gas from the ground to consumers such as home and business users of gas. The nonprofit company employs approximately 275 people and works with a \$175 million budget to manage some 500 active R&D projects at any given time, Naughton said.

In 1984, GRI officials decided that something must be done

with their systems. There were discrete systems for all of the different areas of the company: budgeting, planning, contract management, financial management and membership management. Naughton's job in 1985 was to get started on plans to integrate all of those Wang Laboratories, Inc. systems and rid the company of expensive dupli-

cation. He was also told to retain the company's significant investment in Wang hardware.

A two-day workshop with departmental representatives was called in the fall of that year. "It was an interactive workshop designed to elicit their ideas on what the system should look like when it was completed two years

Continued on page 98

Data View

Pros and cons

The greatest strengths of MIS in the industrial services sector are also its greatest weaknesses, according to a survey of 50 information systems execs*

Strengths	Number of responses	Weaknesses	Number of responses
People	28	Budgets	11
Systems	11	Systems	6
Budgets	5	People	5
Employee retention	5	Schedule commitments	5
Schedule commitments	3	Employee retention	4

* Includes businesses such as personnel and maintenance services

SOURCE: NEWTON-EVANS RESEARCH CO.
CW CHART: FRANK C. O'CONNELL

IS looks

CONTINUED FROM PAGE 97

hence," he said. That workshop proved that the decision for integration was one that was widely supported.

Calling together non-IS workers to help design a new system brought about some apprehension from the workers, and there was also some tension because entry level and support staff personnel suddenly had to work closely with upper-level management, Naughton admitted. Once the group started working, however, those tensions and apprehensions quickly melted away because the members started off with the same limited knowledge of systems, he said.

Two years, many meetings and several system prototypes later, the integrated system was put into place. Much of the system was designed by outside consultants based on the needs outlined by the work group.

Wang migration

Under Naughton's direction, GRI has moved from one Wang VS 100 and one VS 85 minicomputer to one VS 300, one VS 7310 and two VS 85s. While he admits that building on a base of Wang equipment gave him some sleepless nights during the development process — "There was always the possibility that we had overreached in terms of the hardware, operating system and database management capabilities, and even today we have a

problem with slow response time" — Naughton said he is generally pleased with the Wang hardware. The company is slated to be one of the first recipients of the new Wang VS 10000, which will significantly improve throughput and CPU time, he said. The software being used is Wang's Pace relational database management system.

Two months after the system was installed, another workshop was held, this time to solicit reaction to the system which the workers had helped to design, Naughton said.

"The people who attended the workshop were primed to talk about the system," Naughton said. "It introduced technology to them that they had not experienced before, and it brought to the

company's business operations a discipline that had never really been enforced before." Some of the feedback was negative because the employees found that the new system forced discipline.

The integration of the data turned the system's various database portions into checks on other portions of the database, Naughton explained. For instance, when preparing the budget prior to the upgraded systems, any change in the budget numbers would be made in a word processing system but would not automatically be updated in the mainframe. "By the time the word processing document was published, the numbers in the computer became almost meaningless," he said. The new system assures the integrity of the database at all times.

Attitude improvement

The system has been in place for more than a year, and many user-friendly adjustments have been made to it during that period, Naughton said. Even extensive prototyping cannot create perfect systems, he warned.

"When using prototypes, you've got to ask the question, 'Are we doing things right, or doing the right things?'" he said. When a user is shown a prototype, he can become enraptured by the new technology and lose sight of crucial business elements that are missing, much as the developer becomes excited about the prototype and may leave out a critical algorithm, Naughton said.

But even now, the systems are still being closely studied. A review committee of users was set up in January to look at proposed software projects and rate them by priority. Also, a database administrator's forum was established once the system was implemented to help inform users of changes, modifications or enhancements to the database or the system.

Kaiser Aluminum sells data center to start-up firm

COLUMBUS, Ohio — The recent sale of Kaiser Aluminum & Chemical Corp.'s Midwest Regional Data Center here has meant a smooth transition for the 16-member staff.

Kaiser sold the data center as part of an approximately \$250 million asset sale package — including two aluminum reduction plants in Ravenswood, W. Va. — to Ravenswood Aluminum Corp., a new firm headed by a former Kaiser vice-president who managed the Ravenswood operation. Ravenswood Aluminum was formed by Stanwich Partners, Inc., an investment firm in Stamford, Conn., that paid \$168 million in cash and assumed debts of \$88 million.

The data processing operation was renamed the Ravenswood Data Center, but that was about the biggest change, according to Operations Manager George DiBacco. "We did 70% of our work for the Ravenswood plant already," he said. "We will retain some of the work for Kaiser."

The data center supports Ravenswood's aluminum processing with an IBM 3081 D and 3083 EX running MVS/XA, DOS/VSE and VM.

Tandy® Computers: The broadest line of PCs in America.

The Tandy 5000 MC

Our most powerful 386™ based computer ...made in America.

The Tandy 5000 MC Professional System is pure performance, from the Intel® 80386 processor operating at 20 MHz to the fast memory with cache controller that provides rapid access to your data.

With the 5000 MC, you have the high-performance platform needed to take full advantage of industry-standard MS-DOS® applications, powerful new MS® OS/2 programs or multiuser SCO™ XENIX® software.

Operating at 20 MHz, the 5000 MC cuts through the big jobs like database management, large spreadsheets and sophisticated graphics. And with its IBM® Micro-Channel compatible architecture, the Tandy 5000 MC is the ideal high-end PC workstation.

The architecture also provides high performance in data-transfer rates when the 5000 MC is configured within a 3Com® workgroup or multiuser environment.

The Tandy 5000 MC is the new alternative in personal computing. From the best-selling family of PC Compatibles in America.

Send me a 1989
RSC-20 computer catalog.

Mail to: Radio Shack, Dept. 89-A-772
300 One Tandy Center, Fort Worth, TX 76102

Name _____
Company _____
Address _____
City _____ State _____
ZIP _____ Phone _____

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Tandy Computers: Because there is no better value.™

Intel/Reg. TM and 386/TM Intel Corp. IBM/Reg. TM and Micro Channel/TM IBM Corp. MS, MS-DOS and XENIX/Reg. TM Microsoft Corp. SCO/TM The Santa Cruz Operation. 3Com/Reg. TM 3Com Corp.



Now SUPRA[®] Knows No Limits.

SUPRA Version 2: Everything you've always wanted. And more.

SUPRA Version 2: The only SQL, advanced relational DBMS that removes the boundaries between IBM[®], VAX[™], and UNIX[®] platforms—giving you the foundation you need for a totally distributed environment.

SUPRA Version 2: Unsurpassed ease of use, performance, and automatic integrity enforcement through its unique Three Schema Architecture—meaning functionality and control for your entire organization.

SUPRA Version 2: World-class advanced relational technology with significant SQL extensions and integrated CASE tools—providing a comprehensive relational productivity environment that enables you to use information as a strategic resource.

SUPRA Version 2: Commitment to international ANSI/ISO standards with SQL. Call today for more information and a demonstration.

1-800-543-3010

In Ohio, 513-661-6000 • In Canada, 1-800-387-5914

 **CINCOM**
The Better The Solution, The Better The Value.SM

digital Cooperative
Marketing
Program

IBM is a registered trademark of International Business Machines; VAX is a trademark of Digital Equipment Corporation; UNIX is a registered trademark of AT&T Corporation. © 1988 Cincom Systems, Inc.

MANAGEMENT BRIEFS

Certification group airs revamped exam mode

The **Institute for Certification of Computer Professionals (ICCP)** in Des Plaines, Ill., announced that it has begun preparing new versions of its certification examinations that will go into effect in January 1990.

The new structure, which the ICCP said will be more challenging, is a response to market demand for certification in new areas of specialization, market demand for testing depth vs. breadth in specialty areas and a need to improve efficiency in developing ICCP exams.

The exam structure will be based on a single core exam required for all designa-

tions and will be put in place for certified data processor, certified systems professional and certified computer programmer designations and associate computer professional certificates.

The core exam will be designed to test "the main areas of knowledge required of every information systems and information technology professional," ICCP President Mike Maier said.

The overall testing period will be two hours longer in the new structure, because all candidates will be required to pass two specialty exams in addition to the core exam, Maier said.

Current candidates for certification will continue to use the existing test. The revised exams will be given for the first time in May 1990. Any candidates with exam sections left to complete in the present structure will be able to continue in that structure through the period defined in the application announcements.

The **Computer Measurement Group, Inc. (CMG)** is seeking papers to be presented at the **CMG '89 International Conference** slated for Dec. 11-15 in Las Vegas. Papers should describe new ideas or techniques or should report on experi-

ences of success or failure in the computer performance evaluation area. Abstracts are due by April 3. Inquiries should be directed to General Chairman, CMG '89, CMG Headquarters, 111 E. Wacker Drive, Chicago, Ill. 60601.

The **Twelfth Western Educational Computing Conference**, slated to take place Nov. 16-17 in Burlingame, Calif., is seeking papers dealing with computers and computer applications in areas of interest to instructors and administrative personnel dealing with computers at the college or university level. For more information, contact Dr. Oliver Seely Jr., CSU Dominguez Hills, Chemistry, 1000 E. Victoria St., Carson, Calif. 90747. The deadline for submissions is April 21.

Brittain

CONTINUED FROM PAGE 97

tal and are still being reckoned with in many quarters.

The elements that were introduced have become a permanent part of the scene: women in business, database management systems and a growing awareness of the need for interpersonal communication, even as business had to recognize the need for telecommunications.

Most recently, this mixed marriage of men and women, formality and informality and technology and innovation has given birth to a little monster called the personal computer and a new generation of software that is like a teenager who has not quite yet lived up to his potential.

Unfortunately for the newest generation of programmers, the world of data processing still has a lot of the old along with the new. Some of these programmers predict that their careers will be short-lived. It must certainly be confusing and a lot more difficult to navigate — there is so much out there.

From its relatively small beginnings, the DP world has grown into one as varied as the real world, having distinct subcultures along with a particular native language. The choice of these new programmers in the industry is the same as the personal choice of any young man or woman: finding some stability and security while learning about the rest of the world. It is no small task for anyone, personally or professionally.

It is appropriate that one of the most well-known fourth-generation software packages is named Focus. That is the problem, isn't it? Where do we focus our efforts, our careers, our personal lives and our goals?

Years ago, when Victor Frankl wrote *The Search For Meaning*, he was talking about the search for a focus in our lives. The 1980s have brought a new focus on the personal along with PC technology.

That personal focus is the emphasis in business, in our health clubs and in the popular media, only now it seems to be reaching out to something, pulling the world back together.

Mass media is becoming personal media. We are once again valuing personal creativity but as an experience that must be shared and that combines all of those elements of individual ability, communication, meaning and focus.

Brittain is a senior programmer analyst at Capital Holding Corp. in Louisville, Ky.

We see network from a different Yours.

See for yourself how NetView™ can help keep your network up, and your costs down.

At IBM, we've helped more companies set up and manage computer networks than anybody else.

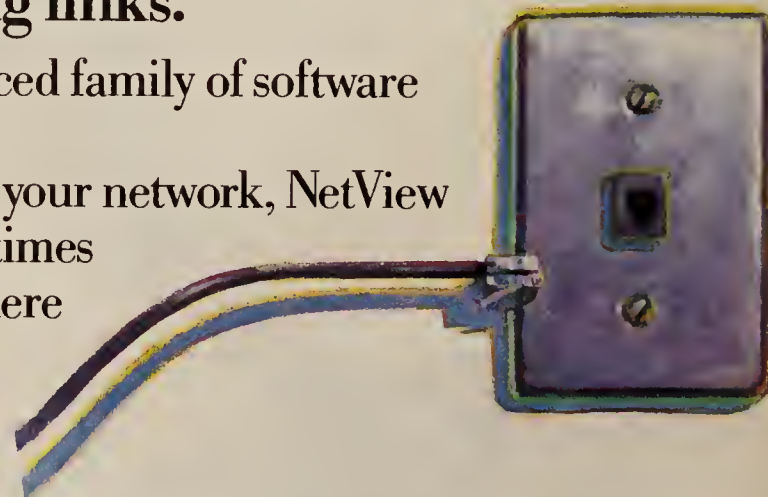
We've learned that no two companies have the same needs. And we know how cost efficient and productive your network can be when you manage it yourself. And that's exactly what IBM NetView lets you do.

NetView solves your missing links.

NetView is IBM's innovative, advanced family of software that lets you control your network.

If there's a weak link or problem in your network, NetView finds it, and enables you to fix it. Sometimes automatically, so no one's even aware there was a problem.

And NetView helps you manage IBM and non-IBM systems, so whether you're designing a new network or improving your present one, your investment is protected.



Erbrick

CONTINUED FROM PAGE 97

Erbrick himself works shifts loading tapes.

UPS is a very method-oriented company. Routine procedures are systematically studied for ways to make them more efficient. For instance, drivers observe particular guidelines designed to save time such as stepping up onto the truck with the left foot, which eliminates unnecessary steps, and picking up a package at diagonal corners so it can easily be spun around to locate the address.

Erbrick has attempted to bring such methods into IS. Service to IS customers is constantly measured, and weekly reports are generated and distributed to all

staff. The number of calls per day to the help desk are recorded as well as the time spent responding. User satisfaction is frequently measured by asking users if they got the help they needed.

Because of demands for increasingly skilled employees, UPS has only recently relaxed its hiring policy of requiring all employees to start at the ground level, either sorting packages or driving trucks.

IS is therefore made up of employees from the old school who have worked their way up as well as new hires from the outside. Erbrick is aware of the potential for resentment between the two groups of employees; one way he tries to bring his staff closer is to get them involved in projects together.

UPS is known as a charitable organiza-

tion, and IS is one of the firm's most active groups. Recently, members of the IS staff and Erbrick spent several weekends painting and fixing up Seton House, a home for unwed mothers in Jersey City, N.J. During this project, Erbrick was just one of the workers, taking his assignments from an IS staffer who was appointed project leader.

Erbrick likes to say that all this makes his people feel good, but one can tell from the enthusiasm in his voice that it makes him feel good as well.

Erbrick is in charge of all of UPS' worldwide computer systems, including both air and ground operations. He oversees almost 800 employees at the main data center in Paramus, N.J., as well as 400 in the field.

Although for many, UPS may conjure up an image of familiar brown delivery trucks bearing gifts, the company has rapidly expanded into global markets and has literally become an airline with a fleet of more than 100 commercial-class planes.

As UPS has expanded, Nelson says that the company has begun to rely more and more on its computer resources. "We have gone from largely using computers to send out bills to running our business" with computers, he says. Today, computer systems do everything from monitoring UPS airplane engines to tracking packages worldwide. Under Erbrick's guidance, information services has grown from a group of less than 100 in 1985 to more than 700 now to meet these changing needs.

management point of view.

NetView makes your computer the perfect host.

Like any good host, your computer shouldn't keep people waiting.



NetView works to provide more reliable, consistent service to everyone on your network. It automatically handles routine computer and network messages, so your control center operators can concentrate on the really important ones. As a result, your network runs better with fewer processing delays.

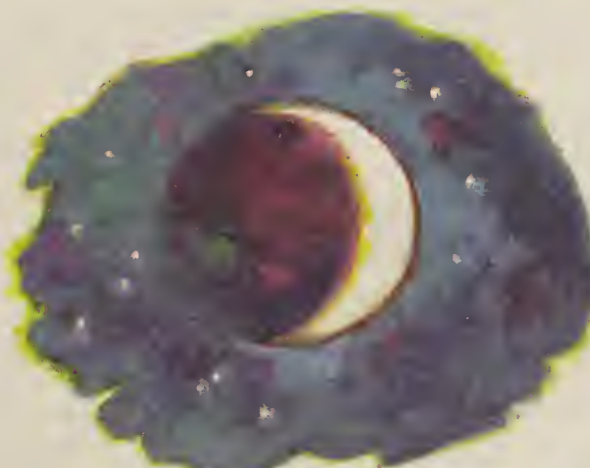
NetView works nights and weekends, too.

NetView can run unattended to keep your network and systems working around the clock.

And since NetView never sleeps, you can do business at any time, anywhere in the world.

If you're setting up a network, or trying to make the one you have more productive, we'd like to show you how NetView can help you now. Just call your IBM Representative.

IBM



CALENDAR

MARCH 5-11

BRS Information Technologies User Meeting. San Diego, March 6-7 — Contact: BRS Information Technologies, 1200 Rt. 7, Latham, N.Y. 12110.

Software Re-engineering Symposium. San Francisco, March 6-8 — Contact: Digital Consulting, 6 Windsor St., Andover, Mass. 01810.

Voice '89 Conference and Exposition. Santa Clara, Calif., March 6-8 — Contact: Information Publishing Corp., P.O. Box 42375, Houston, Texas 77242.

Federal Office Systems Expo, FOSE Software and FOSE Graphics. Washington, D.C., March 6-9 — Contact: National Trade Productions, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Annual Convention of the Alpha Micro Users Society. Irvine, Calif., March 6-10 — Contact: Alpha Micro Users Society, 735 Walnut St., Boulder, Colo. 80302.

Conference on EDP Performance/Capacity Management. Phoenix, March 6-10 — Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

IEEE Conference on Artificial Intelligence Applications. Miami, March 6-10 — Contact: The IEEE Computer Society, 1730 Massachusetts Ave., N.W., Washington, D.C. 20036.

CAD/CAM/CAE Strategy Workshops '89. Cambridge, Mass., March 7-8 — Contact: Daratech, P.O. Box 410, 140 6th St., Cambridge, Mass. 02238.

Profiting From Mission-Critical Systems. Boston, March 7-8 — Contact: Laura DeMaio, Business Research Group, 221 Columbus Ave., Boston, Mass. 02116.

Public Conference of the American National Standards Institute. Washington, D.C., March 7-8 — Contact: American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

MARCH 12-18

The Seventh National Conference on Measuring Data Processing Quality and Productivity. Orlando, Fla., March 15-17 — Contact: Quality Assurance Institute, 7575 Dr. Phillips Blvd., Orlando, Fla. 32819.

Service Leadership in the 90s for Senior High-Tech Executives. Monterey, Calif., March 16-17 — Contact: AFSM International, Suite 25, 1342 Colonial Blvd., Ft. Myers, Fla. 33907.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any job changes in Managers on the Move. When you have news about staff changes, be sure to drop a note or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

"...Computerworld Response Cards reach our market. I know this because we got 260 cards back right away."

Carlos Cadalzo is president of Integrated Systems Technology, Inc., a 10-year old CICS consulting company that recently began marketing PC-based development tools for on-line systems.

The company created the Quick Screen 3270, a development tool that helps analysts design screens for CICS and IMS/DC systems — without requiring a programming background. The next step was to determine the best way to reach the buying market for this new tool. And for Carlos, the first option that came to mind was *Computerworld*.

"I wasn't sure exactly how to do it, but I knew that Computerworld reaches the people we want to talk to. So when I met with a Computerworld sales representative and described the situation, he suggested Computerworld Response Card decks."

"The result was great news all around. I learned there is definitely a market for the Quick Screen 3270 — and that Computerworld Response Cards reach that market. I know this because we got 260 cards back right away. And four weeks later they were still coming in, which is also very impressive."

"At first we were concerned that we didn't have the resources to do a full market study, but the cards told us everything we needed to know. We got both quantity and quality in terms of responses. At least 20 cards came back from Fortune 500 companies alone."

"Now that we know the power of these cards, we plan to continue advertising through them in the future. I certainly recommend them for test marketing, advertising and anything else that requires reaching a large and receptive audience."

Computerworld Response Card decks give you a cost-effective way to reach a powerful buying audience of over 127,000 computer professionals. They're working for Carlos Cadalzo and Integrated Systems Technology, Inc. — and they can work for you. Call Norma Tamburrino, Account Manager, *Computerworld* Response Cards, at (201) 967-1350 to reserve your space today.



— Carlos Cadalzo
President
Integrated Systems Technology, Inc.

COMPUTERWORLD RESPONSE CARDS

Computerworld is an IDG Communications Publication

INDUSTRY INSIGHT

Dennis Noonan

The emperor is really naked



Just about this time last year, a major computer company held a gala celebration to mark its entry into the billion-dollar annual revenue club. "Breaking through" was the theme of the day. Local employees were bussed en masse to a huge auditorium, where they were treated to a free lunch, free entertainment and a large dose of rah-rah.

The company was clearly doing well. Excess cash was burning holes in the coffers; the chief executive officer proudly confirmed to the crowd that the corporation was moving ahead with an announced plan to acquire another half-billion-dollar computer company.

Hardly anyone in that audience would have believed that more than 700 of their fellow employees — including the CEO — would be looking for new jobs within six months. And few would have predicted that the company itself would become

Continued on page 109

Sequent CEO maps out competitive plan

Strength lies in its price/performance ratio

BY ROBERT MORAN
CW STAFF

Sequent Computer Systems, Inc. intends to be a major player in the on-line transaction processing (OLTP) market, and Chairman and Chief Executive Officer Casey Powell is drawing a roadmap of the route the Beaverton, Ore.-based company will take.

"We intend to blanket the market with a combination of direct sales and opportunistic OEM agreements," said Powell, who was on hand last week to discuss Sequent's newly announced OEM agreement with Unisys Corp.

The strategy is not new, especially for young hardware vendors that have floated their companies on the economies of the

Unix operating system and have struck crucial strategic relations with vendors of relational database management systems. In Sequent's case, these RDBMSs are Relational Technology, Inc.'s Ingres and Oracle Corp.'s Oracle.

But the big differentiator is Sequent's price/performance ratio, which beats its competitors' by almost 50%, according to company claims. The combination of its Unix-based operating system, which is called Dynix and is compatible with AT&T's Unix System V and University of California at Berkeley's Unix 4.2, and its proprietary Symmetry architecture allows the concurrent operation of as many as 30 Intel Corp. 80386 CPUs for an aggregate power of up to 120 million instructions per second



Sequent's Powell

(MIPS). The systems range in price from approximately \$89,000 for an 8 MIPS system to \$1 million for a 120 MIPS system. Powell said that the company will offer a 150 MIPS system

by year's end.

According to Powell, "The inexpensive systems and marketing channels have paid off to date." For the year ended Dec. 31, 1988, the company reported \$76.1 million in revenue — a substantial leap over the \$38.5 million reported for 1987. Net income for the year was \$6.5 million.

In addition, the fourth quarter saw a decisive flourish, with revenue of \$24.2 million and a net income of \$2.2 million. Those

numbers were boosted by the company's fourth-quarter catch of Reebok International Ltd., Tootsie Roll Industries, Inc. and Apple Computer, Inc. Of the

Continued on page 108

User demands fueling network buyout fire

BY PATRICIA KEEFE
CW STAFF

An increasingly demanding user community is one of the major forces fueling a recent spate of buyout rumors that is stirring up activity in the computer industry's communications sector, according to analysts.

Some of the firms providing

grist for the rumor mill have been pegged as probable acquisition targets due to financial, product or marketing weaknesses. Others, however, while not necessarily large in size, are distinguished by stellar performances as niche players.

Perhaps most heavily affected by the ground swell is Digital Communications Associates,

Inc. (DCA) in Alpharetta, Ga. The T1 and terminal-emulation product supplier has remained mum on reports that have the firm being sold in toto one day, sold off in segments on another and the subject of a leveraged buyout by former and current company officials the next. Both Siemens AG and Rockwell International Corp. are said to have offered \$30 a share for DCA, which was trading at \$20.75 per share at press time.

Analysts marvel at the volume of traded rumors almost as much as the amount of stock traded based on those rumors. DCA stock has come down from a trading high of 500,000 shares to about 200,000, one DCA in-

sider said. But most agree with longtime DCA watcher Mary McCarthy, an analyst at C. J. Lawrence, Morgan Grenfell, Inc. in New York, who said there is little doubt that the firm will be the subject of a major financial transaction sometime this year.

Analysts said they believe the same user needs that have spurred many mergers and acquisitions are also driving the heightened expectation for more such combinations. Users have become less willing to deal with a multiplicity of vendors, particularly when facing the task of integrating multivendor voice and data systems into seamless enterprisewide networks. One result of such mounting impatience is a rise in user-based pressure on vendors to support competi-

Continued on page 104

Layoffs-plus as Unisys cuts costs

BY NELL MARGOLIS
CW STAFF

BLUE BELL, Pa. — Anyone who blinked last week probably missed one of the latest cost-cutting moves at Unisys Corp. First, the \$10 billion computer and electronics giant fielded an inventory reduction plan, then a voluntary retirement plan and finally a major work force reduction in an ongoing effort to keep expenses under control during a taxing product transition.

Some 1,700 U.S.-based Unisys jobs were eliminated last week in line with the company's plan to pare its employee roster by 3% by the end of this year, a Unisys spokesman said.

The nationwide reduction hit approximately 190 marketing, administration and engineering employees at Unisys' headquarters here, a company spokesman said.

As a result of the imminent consolidation of certain Blue Bell-based engineering and development operations with a similar, larger operation at Unisys' Roseville, Minn., plant, some 100 engineering jobs at headquarters were cut immediately, the spokesman said. Another 400 engineers will continue work through July.

The company also announced the impending closing of an assembly plant in Mexico, which

will cancel 400 jobs.

Earlier in the week, Unisys, which recently reported disappointing fourth-quarter earnings attributed to the costs of a major transition within one of its product lines, revealed plans for a voluntary retirement and so-called "voluntary layoff" program covering between 900 and 1,000 U.S.-based employees.

News travels fast

Word of the voluntary retirement plan followed closely on the heels of news that Unisys had launched a substantial inventory reduction program.

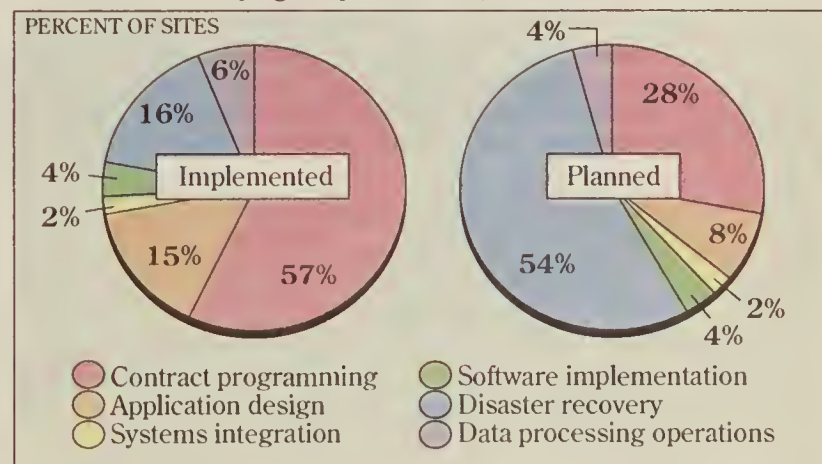
Analysts continued to applaud Unisys' cost-containment efforts and to evince at least guarded optimism with regard to the company's chances of emerging from an expected weak first half of 1989 into a more robust third and fourth quarter.

Unisys, said Philip Fearnhead, an analyst at London-based Kleinwort Benson Securities, is fighting a less extreme version of the battle that is battering Westwood, Mass.-based Cullinet Software, Inc. "They're trying to maintain an old, low-growth business while simultaneously launching what amounts to a new start-up business," he said.

Data View

Service schedule

Contract programming is the most popular outside service used, but disaster recovery has become a major concern at IBM and plug-compatible mainframe sites



SOURCE: COMPUTER INTELLIGENCE
CW CHART: FRANK C. O'CONNELL

User demands

CONTINUED FROM PAGE 103

tors' equipment.

This, in turn, is forcing many vendors to become overnight experts or risk losing customers. These companies can launch time-consuming intensive research and development efforts to home-brew the required technology, strike strategic alliances with vendors that have the technology or, in an effort to maintain control, simply buy what they need.

"The vendors are all talking about doing internetworking, but they don't have the time to go out and reinvent the wheel, so there has to be some consolidation on the way," said Richard Kimball, an ana-

lyst at Montgomery Securities in San Francisco, following a recent visit to Communication Networks '89.

The impact of user pressure on the communications market was reflected in the alliance announced last week [CW, Feb. 20] between Network Systems Corp., Excelan, Inc. and Wellfleet Communications, Inc., all providers of different pieces of the connectivity puzzle.

The impact can also be seen in purchasing and marketing trends expected to further local-area network penetration of the corporate sector. For instance, a recent report issued by Boston-based Business Research Group noted a shift in focus among the leading personal computer LAN vendors from supplying traditional low-end PC networks to functioning as

network integrators.

In some instances, PC LAN vendors are hobbled by their limited recognition factor within MIS, which is increasingly taking control of LAN purchasing. "A large company's organizational networking strategy will require that the vendor be regarded as a credible, long-term player," the Boston Research Group said. Partnering with a large systems or even high-end communications vendor can change that.

It worked for Tops, a provider of low-end networking among MS-DOS, Apple Computer, Inc. and Unix PCs that is now a division of Sun Microsystems, Inc. General-purpose LAN vendor Ungermann-Bass, Inc. was also purchased last year, in this instance by fault-tolerant systems

maker Tandem Computers, Inc.

User pressure is unlikely to lessen this year. If the past year is any kind of precedent, this could well mean that the computer industry will see many connectivity vendors opting for the combination route in the coming months.

In addition to pressure from a more sophisticated and demanding user base, analysts find a very basic impetus for communications combination. They estimate that only 18% of the installed base of PCs have been hooked up to a LAN.

Cullinet stands on shaky ground in third quarter

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. warned investors to expect a net loss for the company's third quarter. The numbers that emerged last week, however, exceeded its own worst expectations and left the faith of even formerly bullish analysts shaken on the subject of the speed — and even the possibility — of the vaunted Cullinet turnaround.

Revenue of \$47.1 million for the quarter ended Jan. 31 marked a 13% drop from the \$54.2 million logged in the comparable quarter last year. The quarterly net loss of \$16.2 million, including a one-time \$5.6 million restructuring charge, made a stark comparison with last year's third-quarter net loss of \$12.7 million, which included a \$13.7 million nonrecurring charge.

In a prepared statement, Cullinet President Robert K. Weiler admitted that Cullinet underestimated how little it could depend on its more mature product lines — which include IDMS/R database-related products — to produce revenue over the past several months. However, he pointed out, "Revenue from products introduced in the last 12 months strengthened during the quarter."

Even so, analysts showed profound concern over this latest setback for the beleaguered software maker. "The numbers are ugly," said Bob Therrien, an analyst at Paine Webber, Inc.

The recent sorry performance, said Philip Fearnhead, an analyst at London-based Kleinwort Benson Securities, should not urge a rush to judgment on the executive ability of Weiler, who was recently named president of Cullinet. However, Fearnhead conceded, the failure of Cullinet's 11th consecutive quarter without profits to live up to the firms's whittled-down expectations "means that the turnaround that's been in progress for a long time is going to be in progress for a long time."

More disturbing is "the nasty risk that if they go on at this rate, they'll just run out of cash," added Fearnhead, who has been among those observers bullish on Cullinet.

Such a risk is not an immediate one, said Cullinet Vice-President and Chief Financial Officer Douglas Robinson. The company, he said, has a \$25 million line of bank credit, a small portion of which was exhausted as of the end of the third quarter.

Computerworld Perspectives 1989
June 20-21, New York City

Buying Smart:

Pacing Your Information Systems Portfolio



Shoshana Zuboff, of the Harvard Business School and author of "In the Age of the Smart Machine: The Future of Work and Power" will open PERSPECTIVES 1989,

the first senior executive planning meeting designed exclusively for corporate users of information systems with a point-by-point outline of where technology must be used in the next three years to enhance your competitive advantage.

Her opening remarks will analyze the evolution of the information-based corporation, with a special look at how changes affect both corporate power and influence. The most articulate IS planners in the country will then discuss subjects relating to three critical themes which include:

Buying Smart: Pacing Your Information Systems Portfolio. Information systems provide competitive advantages. We'll take an in-depth look at how the computer-integrated organization is managed, which technologies are needed, and how to best pace your investment.

Important topics to be discussed include *Network Management and Connectivity: The Smartest Connections and Security: Protecting your Critical Corporate Resources.*

Winning Strategies: Information Systems and the New Corporation. The interaction between systems and structures requires a workable balance between strategic control and freedom of access. Here's an opportunity to analyze just how your IS plan and corporate business plan interrelate.

Important topics to be covered include:

The Value of IS Investment: Measuring the Return and MIS as a Profit Center.

Mandates for Change: Information Systems in the 1990s. Your information systems will reshape the way your company does business well into the next century. Looking ahead sharpens your ability to maximize current technologies while planning for the systems of the future.

Important topics to be explored include: *Power Ties Effective Partnership with Top Management and The Customer as a Partner.*

To gain the knowledge you need to position your company competitively for bottom line success tomorrow, reserve your seat now at this important meeting.



Yes!

I want to attend Computerworld PERSPECTIVES 1989!

☐ Enclosed is a check or money order in the amount of \$1500, payable to Computerworld PERSPECTIVES 1989.

Please complete the information below or attach your business card. Our V.I.P. Registration Service will confirm all arrangements regarding your conference registration and hotel accommodations.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Name of Executive Assistant _____

Mail to: Leslie Price
Computerworld PERSPECTIVES 1989
5 Speen Street, Framingham, MA 01701

Why is
COMPUTERWORLD
the best read
publication* among
MIS executives
in America?

... because it's America's
"Best Computer Newspaper"**

Can you afford to be last on the routing list for the news you need? Well now's the time to order your own subscription to **COMPUTERWORLD**. That way you'll stay abreast of all the latest news, products, people, developments, trends and issues — things professionals like you need to know to get ahead. And stay there.

Don't delay, order now. You'll get 51 information packed issues. Plus bonus issues of **COMPUTERWORLD** Focus on Intergration absolutely FREE. You'll also get our special Spotlight section ... featuring detailed head-to-head comparisons of the industry's latest products.

Use the postage paid subscription card bound into this issue and get your own subscription to **COMPUTERWORLD**.

* The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace".

* The Adams Co. (1988) — "Information Processing Management Study."

** Third Annual Computer Press Awards Competition (4/12/88)

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
January 16, 1989 • Vol. XXIII • No. 2 • 118 Pages • \$2/Copy • \$44/Year

COMPUTERWORLD

INSIDE

Product Spotlight —
MIS dabbles in

Court: States may tax net traffic

BY MITCH BETTS
CW STAFF

ON D.C. — A.U.S.

ume transaction networks such
as airline reservation systems,
may wind up moving their data
centers to "tax haven" states
that do not impose telecommuni-

"This will definitely affect
site-location decisions," said
Kenneth L. Phillips, vice-presi-
dent of telecommunications poli-
cy at Citicorp in New York and
chairman of the Committee of

**On SQL
Server's
test trail**

Continued on page 16



Bruce Sobolov, Director,
Equipment Planning and Administration,
Election & Survey Unit, CBS News

Laura Gismondi,
Account Executive,
AT&T Data Systems Group

Bruce Goldberg,
Area Technical Manager,
AT&T Data Systems Group



Bruce Sobolov of CBS News, Laura Gismondi and Bruce Goldberg, AT&T, savor the afterglow of their own post-election victory. They take us behind the scenes for a glimpse at some of the reasons why CBS was successful on election night.

FEBRUARY 15, 1989

AT&T: Afterwards, the critics said CBS was the best, the fastest.

CBS: Right, but we sweated it out for more than a year. With more 20-hour days than I care to remember.

AT&T: Your situation was pretty complicated.

CBS: We were faced with election projections, exit-poll analysis, and other studio programming applications running on IBM hosts.

AT&T: Plus the NewStar system we tied in with our wide-area network, ISN. It's distributed networked computing. Hey, we thrive on this stuff.

CBS: We're impatient around here. Speed is the only way you succeed with election coverage. The first thing we did was provide multi-host access with the 6500 System. Last election, everybody who needed access to two systems used two terminals. Twice the space, twice the cable, additional controllers, added expense, and wasted time.

We had programmers working simultaneously on three host applications, two bisync, one SDLC. They were constantly skating between terminals, wearing ruts in the rug. Now they have access to multiple sessions simultaneously from one terminal.

AT&T: The data moves over twisted pair, the same type wiring the technicians pulled for your System 75 PBX. That made sense.

CBS: An added advantage was having the same dedicated AT&T technicians installing and maintaining our system, providing consistency to my operation.

AT&T: But really, Bruce, why us?

CBS: Your responsiveness. At

custom host software we always used. We greatly reduced our cost.

AT&T: The other networks are watching, thinking, "How come CBS has the results already and we don't?"

CBS: It was a good night for us. Now the name of the game is streamlining for 1990. We're talking about a networked computer solution as a gateway into different host systems.

AT&T: With the AT&T Systems already up, running, and in place, we can almost completely automate your survey system.

CBS: That's a real big plus for all of us.

AT&T: Something tells me I've seen that same glint in your eye before. (Laughter)

Skating between terminals put ruts in the rug.

CBS, we all agreed that what we needed was someone who could deliver it fast, install it, test it, and support it. And you were hungry. You never said, "No, we can't do it." And you never took long to say "yes."

AT&T: You had computer networking problems. Solving them is the house specialty.

CBS: We do distributed computing to the nth degree. Our reporters are all over the country. They call in their results when the precinct closes. Before, we had over a hundred operators standing by, with phones and terminals. That election night we introduced the voice response system running on AT&T PCs.

AT&T: How many calls?

CBS: Thirty, thirty-two calls at once, reporters everywhere having voice response conversations with the IBM host. And all done with the same

The CBS Solution:

THE CHALLENGE:

Integrate IBM and DEC host computers and NewStar editorial system. Build an advanced computerized voice response system to speed election-night projections.

THE SOLUTION:

AT&T 6500 Multifunction Communication System with multi-host sync/async 6529 terminals. AT&T CONVERSANT® Voice System for advanced communications running on AT&T WGS computers. AT&T System 75 PBX. AT&T Information Systems Network (ISN), a wide-area network.

THE RESULT:

CBS News provided fast, accurate election coverage throughout Campaign '88. The *Baltimore Sun* reported that, "CBS was recording results in all sorts of key races faster and with far more authority than either of the other networks."

Call your AT&T Account Executive, Reseller or 1 800 247-1212, Ext. 154.

IBM is a registered trademark of International Business Machines Corp. DEC is a registered trademark of Digital Equipment Corp. NewStar is a registered trademark of Dynatech Corp. ©1989 AT&T

your computing systems and networking solutions company



AT&T

The right choice.

IN BRIEF

Small is big, again

Hewlett-Packard Co. credited a 7.8% increase in net income and a 21% revenue rise to orders for workstations and personal computers coming on strong in its fiscal first quarter.

Accelerated growth in orders for the multiuser HP Precision Architecture systems, according to President John Young, also kicked into the Palo Alto, Calif.-based computer manufacturer's reported net income of \$193 million on revenue of \$2.7 billion for the quarter ended Jan. 31.

.....

Consortium offspring

The 88open Consortium Ltd., a 55-member, non-profit group formed to boost Motorola, Inc.'s 88000 reduced instruction set computing micro-processor architecture, last week announced an offshoot: **The Software Initiative**, a gathering of software vendors that have pledged to deliver new 88000-based applications this year.

The initial roster of company members include **Wordperfect Corp.**, **The Wollongong Group** and database makers **Relational Technology, Inc.**, **Unify Corp.** and **Informix Corp.**

.....

Looking presidential

Sony Corp. veteran Kazuo Imai last week became president of Palo Alto, Calif.-based **Sony Microsystems Co.**, the division of the Japanese giant's U.S. subsidiary that markets Sony's News family of workstations.

.....

Stalking the Wild Leitz

Prime Computer, Inc. took time out from fighting off an unwanted takeover bid to do a little acquiring of its own. Natick, Mass.-based Prime picked up a majority interest in the System 9 division of privately held Swiss geographical instrumentation systems manufacturer **Wild Leitz Group**.

Sequent CEO

FROM PAGE 103

fourth-quarter systems shipped, 65% were to first-time buyers, Powell said.

Despite such promising direct sales results, the company is still charting an OEM course. As recently as last week, it struck a deal with Unisys, which will add

peripherals and market the Sequent systems as its own. Sequent said it anticipates that the agreement, which covers three years and contains two optional one-year extensions, will generate about \$10 million in 1989 and another \$240 million for the following years.

This particular OEM deal promises to generate more sales. An OEM alliance with Sie-

mens AG in February 1986 changed the face of the company.

Six years ago, Sequent entered the scientific and technical marketplace, which now generates about 20% of its business. But through the OEM agreement, Siemens brought Sequent's older Balance series, which is based on a National Semiconductor, Inc. 32032 pro-

cessor, to the OLTP market throughout Europe.

Today, about 80% of the company's sales come from the commercial marketplace, Powell said — specifically, to those companies that need the combination of departmental machines and RDBMSs.

"We're in the fishing business," Powell said. "We thought we had a good fishing pole. Sie-



Novell gateways undergo stress

At Novell, we think the true measure of reliability is real-life stress.

MIS managers tell us that real-life stress means gateways that support dozens of workstations. And that reliability is the single most important requirement. We listened. Then we set the same high product standards in connectivity that we have with NetWare®.

Optimal gateway reliability. A single NetWare SNA Gateway supports up to 97 workstations with reliable, simultaneous access to multiple IBM or compatible host sessions.

To prove just how reliable Novell gateways are, we have subjected them to the industry's most demanding high-capacity stress testing. And we're happy

©1989 Novell Inc., World Headquarters, 122 East 1700 South, Provo, Utah 84601 (801) 379-5900

mens said that we had a good spear."

Whether with a fishing pole or spear, Sequent hopes to net an even more elusive catch from a joint-venture firm formed in December with Matsushita Electric Industrial Co. in Japan. Called Pana-Sequent, the company will cast its net throughout Japan, particularly to earmark office automation customers.

The joint venture has its subtle side. Although Sequent looks to penetrate the commercial market in Japan, it currently has about 50 systems installed, primarily in the university market. The Pana-Sequent venture, Powell said, positions the firm to defend against continuing shortages in memory components and take advantage of Matsushita's developments in optical storage.

Noonan

FROM PAGE 103

the target of a hostile takeover from yet another corporate raider.

Last month, not quite a year after that magic moment, the new CEO announced that the company plans to lay off another 1,200 workers in an effort to

get leaner and meaner.

Maybe the accountants and financial analysts think that the original takeover deal still looks great on paper. But I'm skeptical: I think all this takeover activity is a bad idea.

A company is more than totals on a balance sheet or a slice of market share on a pie graph. The company is really the people — the living ideas and relation-

ships that make things work the way they do.

Companies are the first to acknowledge this, at least verbally, but actions speak louder than words. High-level corporate takeover decisions seem to forget that the worth of an organization goes far beyond the last quarterly earnings figures.

Shrinking violets

I think part of the problem is that there are not enough people around who are willing to say, "Maybe this isn't such a good idea." Like the courtiers in the fable *The Emperor's New Clothes*, no one with any brains wants to be the bearer of disagreeable tidings. Can you imagine someone raising a hand at the annual meeting to ask, "Hasn't the company gotten big enough?"

Dissent in business is as welcome as a skunk at a lawn party. All the fine lingo of academics notwithstanding, managers in a hierarchy succeed by saying, "Yes, sir." Successful people do not question their boss. Asking questions is seen as cynicism or even disloyalty.

Those who blindly assent to whatever the boss thinks are seen as being on the side of goodness and light. Anyone who is foolish enough to question the growth goals of a successful empire gets the same treatment as the lout who yells, "Hey, the emperor is naked!" at a state parade.

Times are a-changin'

But maybe things are changing. According to a recent news report, General Motors has publicly begun to question the effectiveness of its authoritarian management style.

The motivation to change is said to be Ford Motor's earnings success. A few years ago, Ford, looking for a strategic edge, adopted a program to focus on community and teamwork, the article said. It seems to have paid off.

If Ford and GM are on the right track, maybe communications consultants will start advising companies to do a lot more listening to their employees, especially the so-called cynics. Beware of the carpetbaggers who have no stake in the success of the company. Listen to and reward the people who show enough interest to ask tough questions and propose alternatives.

But if you work for one of those companies where management thinks that it needs to keep expanding the empire, maybe you should discreetly find what the boss will be wearing to next year's kickoff meeting.

Noonan is a free-lance writer based in Wellesley, Mass. He was formerly a project manager at a minicomputer maker in the Boston area.



testing so you won't have to.

to share the results with you. Just call 1-800-LANKIND and ask for our NetWare SNA Gateway Lab Report.

Ask for NetWare SNA Gateways. Make the reliable choice when it comes to LAN-to-mainframe connectivity. See your Gold Novell Authorized Reseller about NetWare SNA Gateways.

For your SNA Gateway Lab Report, or more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter NVSNA7.



For network solutions,
you should be seeing red.

COMPUTER CAREERS

Pick holds future promise

The technology is popular with professionals and growing on management

BY SHERYL KAY
SPECIAL TO CW



In today's competitive environment, where getting critical information to top executives in a timely fashion is crucial, it makes sense to master technologies that can expedite the information flow. Pick, the operating system developed by Dick Pick in the late 1960s, is such a technology.

Pick Systems, based in Irvine, Calif., has licensed the operating system and its Pick Basic language to several firms that produce their own versions. Similarities among the versions far outweigh the differences, and they are making mastery of Pick and Pick-like systems a sound career choice for the 1990s.

Pick is a multiuser operating system known for the ease with which it lends itself to development of applications and reports. One significant drawback, however, is a lack of communications capabilities.

By the middle of last year, there were about 130,000 mainframe and minicomputer Pick installations worldwide and about 80,000 installations of the personal computer version, which has been available since 1984,

according to Steve Crews, vice-president and general manager at Pick.

Sales of Pick operating systems by licensees grew 41% per year between 1982 and 1987, the last year for which figures are available, according to Dan Ness Jr., a senior analyst at market research firm Infocorp. in Santa Clara, Calif.

"We expect the Pick market to continue to exceed the industry growth rate for several years to come," Ness says. The projection stems in part from the portability of Pick applications across hardware environments and the number of value-added resellers writing software for Pick, he says.

Demand at all-time high

Demand for Pick professionals is at an all-time high, says Crews, adding that Pick Systems has started getting requests for help in filling positions, including a significant number in Australia and the UK.

"It's getting more difficult to hire guys for our own R&D lab," Crews says. "Normally, if they've got a very strong Pick background, they're making good money, and there's a lot of companies out there that want to hire them."

"I've worked in Cobol, Pascal, Fortran and assembler,"

says Kevin Shaw, MIS director at Deerskin Trading Post, Inc., a clothing retailer in Peabody, Mass. "Pick Basic has the best from all of these systems in terms of functionality and power."

Shaw, whose company is running Ultimate Corp.'s version of Pick on a Bull H.N. Information

PICK GIVES ME a very appropriate outlet for my creative impulses."

RICHARD CANTY
CORNNUTS

Systems DPS 6, finds that many professionals are attracted to the Pick world because the technology allows them to work rapidly. An entire system, including I/O and update, can be completed in a week. "When I show people who have IBM or DEC operating systems what we've done in a week, they are just taken aback," he says.

With eight years of professional data processing experience, Richard Canty, a senior programmer analyst at Cornnuts, Inc. in Oakland, Calif., has worked with many Pick-like systems. He has also spent eight

months coding Unix C programs. It requires a great deal more time for programmers to get Unix to accept an application, he says.

Canty, a published poet, adds that Pick provides a flexible environment that fosters creative programming. "Pick gives me a very appropriate outlet for my creative impulses," he says.

With the time saved by using Pick, programmer/analysts can broaden their perspectives, says Bob Dedecker, vice-president of products and services at Gemisys, a division of LCS, Inc. in Lakewood, Colo. "It's no longer sufficient just to code lines in a program," Dedecker says. "My people like Pick because they can spend less time generating programs and more time learning our business."

Although most Pick shops will hire professionals proficient in other languages, they would prefer to hire experienced Pick people. "You want someone with experience because he will understand the nuances of Pick — what you can do easily and what can't be done easily," says Dick Gower, director of computer operations at Century 21 Real Estate Corp. in Irvine, Calif.

Stick-to-itiveness

While he hopes to stick with Pick for the rest of his career, Cornnuts' Canty advises professionals who are well-versed in the system to learn Unix as well.

"There appears to be an emerging option to merge the two where they are co-residing operating systems," he says. This symbiotic relationship draws on the best aspects of the two operating systems, including Pick's ease of use and the communications capabilities of Unix.

Experienced Pick professionals earn average to above-average salaries, with three years of experience commanding \$30,000 to \$35,000 a year. Systems analysts and project leaders with five to seven years of Pick experience are earning \$40,000 to \$50,000 a year.

Although such compensation may seem generous, firms using Pick save money because they do not need as many people to run the shop. "In your typical IBM environment, you need quite a few people in there just because the system requires so much hands-on work," Shaw says. "Pick is a great way for some people to experience being the manager of a shop or at least in control of several major corporate systems because we don't need as many people to develop and run Pick systems."

Century 21's Gower jokingly urges caution in choosing Pick as a career option. "Once you get into it, you will never want to leave and go back to anything else," he says.

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.

DATA ARCHITECTS

Florida Location

As the leading supplier of marketing research information on television and VCR viewing habits, you will be challenged to provide state-of-the-art systems for our applications development environment.

Our facility is located on the Sun Coast of West Central Florida, where you'll encounter a beautiful climate, no state income taxes, a \$25,000 homestead tax exemption, low cost-of-living and year 'round outdoor recreational activities.

The Position:

Responsible for analyzing, planning, designing, implementing, and maintaining subject databases utilizing information engineering techniques. Duties include evaluation and implementation of database tools and applications development information consulting.

The Requirements:

Our ideal candidates will have a four year degree in Business, Math, Engineering, or Physical Science plus four or more years of current experience in Data Administration, logical and physical database design techniques such as ERM, and information engineering techniques. Experience in concepts of data driven design such as three schema architecture, excellent analytical skills, and above average oral and written communication skills are mandatory. Experience with relational database technology, CASE tools, and media research is highly desirable.

A salary commensurate with experience and comprehensive benefits are but a few of the reasons you should consider this opportunity. For immediate and confidential consideration, send a current resume or letter to NIELSEN MEDIA RESEARCH, Human Resources, Department CW-227, 375 Patricia Ave., Dunedin, FL 34698. All inquiries will be answered.

An Equal Opportunity Employer m/v/h/v

Nielsen Media Research

BB a company of
The Dun & Bradstreet Corporation

SOFTWARE/SYSTEMS

We have over 50 exclusive openings in NY State for Software Engineers at all levels ranging from 35K to 100K. Requires a BSEE or BSCS (advanced degrees preferred) and 2-10 yrs +, experience in Software/Systems using C/UNIX, VAX/VMS, VAX/ULTRIX, SQL, X Window System or SUN for programs in networked computer systems, particularly in areas of insurance, banking, financial and pharmaceuticals. Interviews are being conducted now! Call 716-272-1817.

- Engineers.....35-60K
- Project Leaders.....65K
- Engineering Supervisors.....70K
- Engineering Managers.....80K
- Architecture Managers.....100K

Send resume & salary to:
Joseph Vincelli
Executive Exchange
366 White Spruce Blvd.
Rochester, New York 14623

SUNNY SOUTHWEST U.S. CONTRACT ASSIGNMENT

* IDEAL/
DATACOM CODERS
New product development

* HEALTHCARE
SYSTEM TESTERS

For immediate consideration
please contact:

THE REGISTRY
40 Washington St.
Wellesley, Ma. 02181
(617) 237-9119
FAX: (617) 237-0723

IDMS SYSTEMS PROGRAMMERS

San Diego

General Dynamics Data Systems Division provides data processing support to all divisions within General Dynamics. We have immediate opportunities for IDMS Systems Programmers to work in a multi-division environment within the hardware and software systems group.

These positions require a minimum of 10 years IDMS Systems Programming experience. Strong IDMS internals, along with a solid understanding of IDMS installation, tuning and trouble shooting techniques is also required, with 2-3 years of MVS systems programming helpful. MVS/XA in an IBM 3090 multi-mainframe environment required.

We offer competitive salaries and a comprehensive flex benefits package including medical, dental, prescription drugs, stock/savings investment plan, education and recreational programs.

Interested candidates please send your resume and salary history to: General Dynamics Data Systems Division, P.O. Box 85926, MZ W2-5150, Drawer 211, San Diego, CA 92138.

GENERAL DYNAMICS

Data Systems Division

Equal Opportunity Employer

GROUND FLOOR DEVELOPMENT OPPORTUNITIES WITH INDUSTRY LEADER

Columbia, South Carolina

As part of our commitment to be a leader in the life insurance software development field, Policy Management Systems Corporation is currently building a technical staff of professionals who will have key development responsibilities for PMSC Life Software products.

- LEAD PROGRAMMER ANALYSTS
- SENIOR PROGRAMMER ANALYSTS
- PROGRAMMER ANALYSTS

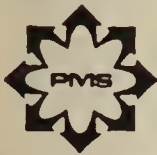
Experience with life and health systems applications is a plus.

This is an excellent opportunity for personal and professional growth in our state-of-the-art environment using DB2, COBOL, CICS, and IBM's presentation manager. Hardware consists of IBM 3090, AS400's, PS2, related peripherals and auxiliary equipment.

Opportunities also exist for life insurance, business analysts and consultants.

PMSC is a rapidly growing \$250,000,000 international software and service company with over 500 customers. Headquartered in Columbia, South Carolina surrounded by a healthy economic environment and responsive governments that are developing high educational and cultural opportunities for all citizens. For immediate consideration call: (803) 735-5580.

Or send in confidence your resume or letter to: **Wes Daniels, Policy Management Systems Corporation**, PO Box Ten, Columbia, South Carolina 29202. An Equal Opportunity Employer M/F.



JOIN LOCUS AND EXPERIENCE UNIX*

Locus Computing Corporation, is the developer of TRANSPARENT COMPUTING FACILITY—The UNIX Network For the 90's. Transparent Computing Facility provides unprecedented power and flexibility by presenting the appearance of a single system while exploiting the advantages of both centralized and distributed architectures. Presently we have rewarding opportunities in the following areas:

- ARCHITECTS
- SYSTEM PROGRAMMERS WITH UNIX KERNEL EXPERIENCE PLUS IBM VM, OS/2 or MS/DOS
- UNIX DEVELOPMENT PROJECT LEADERS
- QUALITY ASSURANCE PROJECT LEADERS
- UNIX SYSTEMS/APPLICATIONS PROGRAMMERS WITH WINDOWS EXPERIENCE
- TECHNICAL SUPPORT SPECIALIST
- RELEASE CONTROL SPECIALISTS
- TECHNICAL WRITERS

Joining Locus will provide an opportunity to work with nationally recognized UNIX innovators developing transparent connectivity products. Make a career move that will boost your skills and challenge your ambition. We offer excellent salaries and benefits, as well as an opportunity to participate in an equity position.

For immediate consideration, send your resume or call John Fawcett at: (213) 337-5212. Principals only.



9800 La Cienega Blvd.
Dept. CW227
Inglewood, Ca. 90301-4440

*UNIX is a registered trademark of AT&T

An Equal Opportunity Employer

CONSULTANTS CONTRACTORS EMPLOYEES

Human Resources,
Payroll/Personnel
CICS/VSAM, DB2

Please send resume to: Integral Systems, Dept. PS, 2185 North California Blvd., Walnut Creek, CA 94596.

Principals only please. We are an equal opportunity employer.

Large-Scale Population of Achievers

Amdahl's professionals have world-class ability. The outstanding performance of our company and products proves this statement.

Around the world, more than 8,000 individuals are supporting and advancing Amdahl's large-scale, high performance computer systems. Their achievements have made us an undisputed leader in hardware, storage products, communications systems and software.

The caliber of our team will be incentive for you. Expectation levels will challenge you. Projects will demand new ideas, techniques and solutions. You will be in the midst of proficient people who achieve quality results in a timely fashion.

As large as we are worldwide, our teams are structured for visibility and individuality. If you expect the best from your company, your co-workers and yourself, achieve it—with Amdahl.

PRODUCT EDUCATIONAL SERVICES

Be part of our creative computing revolution by teaching clients' technical staff the fine points of using our mainframe systems. As an instructor you will teach classes at Amdahl Education Centers in the U.S. and worldwide. Opportunities include:

- UTS/UNIX** SYSTEMS INSTRUCTOR
Strong C Shell programming, installation tools, 370/XA architecture (preferred)
- Communications Instructor
- TCP/IP, NFS, SNA, RFS, Network Tuning

Please call Barbara Kvek at 1-800-538-8460, extension 6653, or send your resume to her at Mail Stop 300.

CORPORATE COMPUTER CENTER

Be the first to utilize our newest products and first to share major technological advances. Within our Corporate Computer Center, which is one of the largest on the West Coast, you'll be in strategic partnership with our product development and marketing teams. Your experience and expertise in the following area will make you a valuable contributor to our team:

- UTS/UNIX Systems Administrator

Please call Barbara Kvek at 1-800-538-8460, extension 6653, or send your resume to her at Mail Stop 300.

DESIGN AUTOMATION

Develop strategic automated tools which take our mainframe designs from concept and verification through to manufacturing. Intensive design automation experience, including C/UNIX-based technical skills and/or project management expertise, is essential for the following challenges:

- Manager, Physical Design Automation
- Senior Systems Engineers—ATG
- Senior Fault Simulation Engineers
- Chip Physical Design Engineers
- Design Verification Engineers
- Graphics System Development Engineers
- Application/System Software Programmer

Please call Ranell Durgan at 1-800-538-8460, extension 6216, or send your resume to her at Mail Stop 300.

UNIX SYSTEMS SOFTWARE DEVELOPMENT

Dedicated to advancing UNIX systems performance and reliability, Amdahl has implemented the fastest available UNIX for mainframes. Given our history of achievement in this area, you can be sure important results will develop because we're building on the success of our latest UTS product. UTS provides support for new processors, peripherals and communications devices, new operating environments, enhanced connectivity with other systems and increased addressability. If you're ready to begin the next UNIX revolution, you can join it in progress. At Amdahl.

- UNIX Software Development Manager
- Kernel Development
- Communications Development/Support—SNA, TCP/IP, X.25
- Communications Performance Measurement and Enhancement
- Software Test and Evaluation

Please call Bill McCarthy at 1-800-538-8460 extension 8843, or send your resume to him at Mail Stop 336.

One of the best benefits Amdahl provides you is our full support and commitment. Accordingly, our competitive salaries and comprehensive benefits program are first-class. Amdahl Corporation is proud to be an equal-opportunity employer through affirmative action.

Send your resume to Amdahl Corporation, Employment Department 2-17, P.O. Box 3470, Sunnyvale, California 94088-3470. Principals only, please.

*UTS is a trademark of Amdahl Corporation
**UNIX is a registered trademark of AT&T

amdahl
Expect The Best

ANALYST PROGRAMMERS GENEVA

An International Organization in Geneva is looking for two experienced Analyst Programmers for applications development in the field of economic research, supporting the operational activities of the General Agreement on Tariffs and Trade.

The applicant must be competent in IBM/30xx, MVS, TSO ISPF and a high-level programming language. Knowledge of ADABAS/NATURAL and/or SAS would be an advantage. Knowledge of French is desirable.

Salary according to qualifications and experience.

Please send CV and availability to:

Chief of Personnel
ICITO/GATT
Rue de Lausanne 154
CH 1211 Geneva 21

VERMONT & Rural N. New England

• Programmer/Analysts
• Systems Analysts • DBA's • TCA's
• Systems Programmers
3-5 yrs. Mfg. Ins. or Banking experience & IBM 43XX DOS/VSE, 30XX OS/MVS, 3090 MVS/XA, COBOL, BAL, CICS, IDMS/ADSO, IMS, DB2, DL/I, S/36 RPGII, S/38 RPGIII, HP3000 FORTRAN, DEC "C". Co. fee paid. Salaries \$18 to 45K plus relocation assistance.
Please send resume in confidence to:
John Hodska
EDP PLACEMENT ASSOCIATES
P.O. Box 1377C, Stowe, VT 05672
(802) 888-5601

CA & AZ CONTRACTS

CONSULTANTS
WANTED



P. Murphy & Associates, Inc.
10000 RIVERSIDE DR., NO. 5
LOS ANGELES, CA 91602
818/508-8474 714/552-0506

KENDA SYSTEMS, INC. BOSTON • NEW YORK • WASHINGTON

SOFTWARE CONSULTANTS

KENDA SYSTEMS provides consultants to the East Coast High Tech Community. Talented professionals with these skills are welcome to register with KENDA SYSTEMS.

- *ADABAS/NATURAL
- *PL/I-IMS or DB2
- *S/PS-MVS or VM
- *DB2/CICS/CSP
- *SUN/C/FINANCIAL
- *TELON-IMS or DB2
- *VAX/VMS/C
- *MS Windows or Presentation Mgr.
- *UNIX or OS/2 or MS DOS Drivers
- *SAS/FORTRAN
- *AS400 or S/38

Forward resume to Roz McKinnon.

50 E 42nd St., Ste. 1508, NY, NY 10017 212/599-6969

Ukrop's
where people and food
come first

MANAGER, SYSTEMS DEVELOPMENT CORPORATE HEADQUARTERS

A Manager of Systems Development is needed within a well established, family-owned, 19 store supermarket operation in the Richmond Metropolitan area.

This person will report to the Vice-President of M.I.S. He/she will serve as project manager for all systems developed to support our company's present and future computer needs in the areas of finance, store operations, marketing, and human resources.

A college degree is required with course work in computer science, information systems or other related fields. A minimum of five years experience in designing automated systems which operate in a retail food store operation is preferred. Knowledge of PICK-based operating systems is a plus.

The ideal candidate must be willing to commit to serving our internal users (customers) with a caring attitude and a sense of urgency. He/she must possess strong analytical and leadership skills, and above all be a team player.

To apply for this position, please forward your resume and salary requirements to:

Ukrop's Super Markets, Inc.
c/o Rick Carr
600 Southlake Boulevard
Richmond, Virginia 23236

Ukrop's is an Equal Opportunity Employer

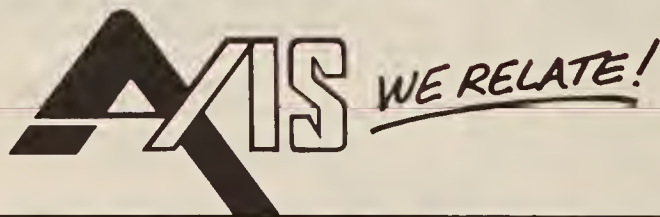
EXPAND YOUR CAREER WITH DB2 SOFTWARE DEVELOPMENT

Axis Systems International Inc. is the premier software development and consulting firm exclusively dedicated to DB2 and CASE technology; with a reputation for excellence that has created an ongoing demand for our services and will more than double our revenues during 1989.

Axis is seeking high-achievers with a minimum of 5 years experience, capable of making a significant contribution to our expertise and growth. Opportunities exist in the New York Metropolitan area, New Jersey, Washington DC, Phoenix AZ, San Francisco CA and Fort Lauderdale FL areas; including but not limited to:

- **DATA ANALYSTS/DATA MODELING** - NY • AZ • CA • FL
CASE tool experience essential
- **DB2 DATA BASE ADMINISTRATORS** - NY • AZ • CA • DC
- **DB2/CICS PROGRAMMER ANALYSTS** - NY • AZ • CA • DC
Code generators a plus
- **SENIOR SALES/MARKETING EXECUTIVES** - NY • NJ • DC • AZ • CA
Strong credentials required in Software Systems Development and/or Management Consulting Services.

Both your compensation and career prospects at Axis Systems will far exceed industry standards. If you are self-motivated and at home in an elite organization, please call (212) 967-3200, or send your resume in strict confidence to: Axis Systems International, Inc., Empire State Building, 50th floor, 350 Fifth Avenue, New York, NY 10118. Equal Opportunity Employer



MONTEREY COUNTY

INFORMATION SYSTEMS



IBM SYSTEMS PROGRAMMERS

Located centrally along the beautiful California coastline just two hours south of San Francisco, Monterey County enjoys a mild climate year-round and close proximity to a variety of winter and summer sports and vacation locations. Monterey County Information Systems provides computer support services to a wide variety of county departments and private business. One IBM 4381 P14, two IBM 4341/12's and one IBM AS/400 Model B40 are currently being utilized.

We have two positions available for immediate hire; Systems Programmer (\$34,296-\$42,492/yr) and Senior Systems Programmer (\$38,088-\$47,194/yr). We offer a competitive salary and excellent fringe benefits. We need people with strengths in VM/VSE, CICS internals, VTAM/SNA, Networking, VSAM and CICS performance analysis and tuning.

If you have at least three years of experience as a systems programmer on IBM systems and would like to relocate to Monterey County, California, we would like to talk to you. Call County Personnel at (408) 755-5116 or write us at P.O. Box 1877, Salinas, CA 93902 and we will send you more information and an application form. Deadline to apply: 3/24/89 EOE

SENIOR PROGRAMMER ANALYST

Senior Pick Programmer Analyst with minimum 3 years experience to lead our programming staff on an ultimate IBM 9377/90. Interested applicants apply by sending resume to:

**Associated Grocers
of Florida**
P.O. Box 520695
Miami, Florida 33152

SR. PROGRAMMER/ ANALYST

EASTERN NORTH CAROLINA

YALE MATERIALS HANDLING CORPORATION is currently seeking a Senior Programmer/Analyst to provide technical and manufacturing systems support for large Unisys mainframe using standard software.

Write Batch and on-line programs for manufacturing systems with user interfacing required. Working knowledge of MRP, CRP, shop floor control, inventory and other manufacturing systems a plus.

Position requires a minimum of 2-4 years experience. Degree preferred, but not required. Work experience should include software: GEMCOS, COBOL 74 Editor, COMS, DMS II, WFL, and CANDEE. Experience with TMS or variations of TMS a plus. 40 hours per week with some overtime and travel.

Our location offers a vast array of cultural and recreational activities with close proximity to both the mountains and beaches.

Please submit resume and salary requirements to:

Employee Relations Department

Yale

**MATERIALS
HANDLING
CORPORATION**

Yale Materials Handling Corporation is an affirmative action employer. Qualified minorities and females are encouraged to apply M/F/V/H

Rt. 11, Box 287
Greenville, N.C. 27834

MANAGEMENT & PROGRAMMERS

BRIDGESTONE SOFTWARE (U.S.A.), INC., with locations in LOS ANGELES and NASHVILLE, is seeking well qualified managers and programmers for each of its IBM Mainframe Shops. Primary language is COBOL in an OS CICS/DLI environment.

Manager positions require 5 years experience in similar capacity, and proven leadership and technical skills. Programmers with at least 2 years in IBM environment using 3090, 43xx Mainframes. We are also seeking individuals with System 36. AS Programming skills are also in demand. Our users work in distribution, sales, finance and marketing systems.

We offer a competitive salary and excellent benefits package. Send your resume, which MUST include your salary history, along with your LOCATION PREFERENCE (Los Angeles or Nashville) to:

BRIDGESTONE SOFTWARE
19701 Hamilton Avenue
Suite 180, Dept. CW
Torrance, CA 90502

Equal Opportunity Employer M/F/H/V

DATA PROCESSING PROFESSIONALS

ARMS, Inc. a leading supplier of Data Processing Services for over 20 years, offers challenging opportunities for Programmers, Analysts, Systems Engineers and Data Base Analysts in our IBM Mainframe and AS/400-S/38 environments. Our continued growth and expansion has created new openings in our Richmond and Virginia Beach locations.

ARMS, Inc. has opportunities for you to join our select team of professionals dedicated to staying on the leading edge of technology. ARMS, Inc. offers exceptional benefits including a company car and competitive salaries. Please forward your resume to:



Director of Personnel
3337 Stoneshore Road
Va. Beach, VA 23452
(804) 468-0016

Equal Opportunity Employer

SOFTWARE DEVELOPERS

INVEST IN YOUR FUTURE WITH 4GL TECHNOLOGY!

4GT develops large information systems using CASE tools and 4GL technology. We are expanding to meet strong customer demand and need proven performers to help us grow. If you have what it takes to succeed, then 4GT has a place for you!

WE OFFER:

- Creative work environment with flexible hours.
- Challenging projects with high customer visibility.
- Advanced technology, including a 4GL system development methodology.
- Opportunity for advancement and compensation based on performance.
- Project team structure with minimal bureaucracy.
- A growing business with a very exciting future.

WE NEED:

TECHNICAL DIRECTOR

- 5 years experience in developing large FOCUS systems in the IBM environment. VM/CMS and other 4GL/DBMS experience desirable.
- 3 years experience leading major development projects.
- Use of a structured SDM. Prototyping experience a plus.

SR. PROGRAMMER ANALYSTS

- 5 years hands-on experience developing large systems.
- 4GL and DBMS experience highly desirable.

PROJECT MANAGER

- Real, proven experience in managing components of a large software development project.
- Minimum 5 years systems analysis/design experience.
- Strong business management financial and administrative skills.
- Ability to work in a dynamic, high-performance team environment.

Send your resume to:

Ms. Sherry Drury
Fourth Generation Technology, Inc.
Department 322
10280 North Torrey Pines Road, Suite 350
La Jolla, CA 92037

An Equal Opportunity Employer - A No Smoking Environment



Westinghouse Idaho Nuclear Company, Inc.

HP 3000 PROGRAMMER ANALYST

We are seeking a candidate with a BS Degree in Information Systems or Computer Science and three - five years HP 3000 experience using COBOL, IMAGE and VIEW. Transact and some IBM JCL knowledge helpful.

The successful candidate will be responsible for analysis, design, programming and documentation for new and existing business applications.

All applicants must have, or qualify for, a DOE "L" security clearance.

For immediate consideration please send resume with copy of advertisement to: Ace Ballard

**Westinghouse Idaho
Nuclear Company, Inc.**
P.O. Box 4000
Idaho Falls, Idaho 83403

Equal Opportunity Employer
U.S. Citizenship Required.

Executive Director for Computing and Information Systems (New Position)

The Executive Director for Computing and Information Systems will manage the academic and administrative computing and telecommunications resources of the University and report directly to the President of the University. This new position will require an effective and forward-looking manager to promote and maintain effective and innovative academic and administrative applications of computer and telecommunication systems to meet the needs of students, faculty, and staff. The Directors of Academic Computing, Administrative Computing, and Telecommunications will report to the Executive Director.

Qualifications: Candidates must have a master's degree in a technical or business area (doctoral degree preferred) and at least five years progressive technical and managerial experience within a large-scale computing-related organization preferably in higher education.

Submit resume to: John F. Chizmar, Secretary, Search Committee for the Executive Director for Computing and Information Systems, Office of the President, Illinois State University, Normal, IL 61761

Illinois State is an Equal Opportunity/Affirmative Action University

DIRECTOR OF ADMINISTRATIVE COMPUTING Rice University

Provide leadership in the planning and management of the University's Administrative Computing Systems. An advanced degree in Management Information Systems, Computer Science, a related computer field or equivalent work exp., and five or more years of exp. in the operation/management of computer information systems required. A demonstrated knowledge of available administrative computing systems/software packages, and related issues and trends needed. Submit resume, two letters of reference, complete salary history (postmarked no later than March 17th) to: June Smith, Rice University, Employment Office, P.O. Box 2666, Houston, Texas 77252. (713) 527-4074. EOE/AA M/F/V/H.

Computer Professionals

Reynolds Aluminum has multiple openings for computer professionals at its Richmond, Virginia Corporate Headquarters. The environment consists of a large network of processors including multiple S/36, S/38 and AS/400 systems and a 3090-600E running MVS/XA, CICS, TSO/SPF, DISOSS and DB2. Migration from S/36 and S/38 systems to AS/400's is underway. Successful applicants will possess a college degree or compensating experience, and enjoy working with a team of highly skilled and motivated professionals in an atmosphere of challenge and growth provided by a Fortune 100 company. Richmond offers excellent educational, cultural and recreational opportunities.

S/38 — AS/400 TECHNICAL SUPPORT

Successful applicants will be part of a team responsible for setting technical directions and implementation of IBM midrange systems and will provide technical support to local, remote, and international data centers. Support responsibilities include performance and capacity planning, systems migration and implementation, problem resolution, and hardware/software evaluation. Successful applicants will be involved with exploiting advanced AS/400 technology including APPC, APPN and SAA. Requirements for positions range from as few as two years to five or more years of S/38 related experience. Familiarity with S/370 architecture systems a plus.

SYSTEM 3X ANALYSTS

Two-three years experience in RPG III analysis and design. Must know SDA, SEU, Query. Experience in APPC and other utilities helpful. Will support manufacturing and technical applications. Development being done on S/38 and AS/400.

3090 APPLICATION ANALYSTS

Minimum 2 years experience in the applied area of interest. Analytical and leadership skills desired. Experience with Human Resources, benefits, manufacturing and distribution applications a plus.

Competitive salary commensurate with experience, including outstanding fringe benefits package and strong educational program. If a fast paced and technical challenge motivates you to top performance, Reynolds Metals has the opportunity you're looking for at our Richmond, VA headquarters complex. Please send resume outlining work and salary history, in confidence, to: P.A. Bowman, Personnel Manager, Information Systems, REYNOLDS METALS COMPANY, P.O. Box 27003, Richmond, VA 23261-7003. Equal Opportunity Employer.



**REYNOLDS
METALS
COMPANY**

Our
quality shines
through

When you own it, it's an easier sell.

Computer Corporation of America is a leading International provider of high performance software for IBM and compatible mainframes. CCA's products are strategically suited to Time to Market applications from which competitive advantages are derived because rapid development and transition into production offers a short payback period and high return on investments. As an employee-owned company, CCA offers a challenging entrepreneurial atmosphere combined with long-standing success in the software business.

We're looking for high energy team players to help drive CCA to continued success.

Sr. Sales Representative

- Develop and implement sales/marketing strategies and programs to create customer and prospect relationships
- Coordinate diverse resources to meet sales objectives
- 3+ years experience with a consistent and successful sales track record which attained/exceeded individual and territory sales quotas in a technical IBM systems environment

Locations: Major metropolitan areas throughout the United States

Branch Manager/West Coast

- Managing of all sales and technical personnel to achieve assigned quotas; developing and implementing account strategies and ensuring customer relationships and satisfaction
- Experience with managing a long complex sales cycle at all levels of an organization
- 7+ years experience with a consistent and successful sales track record which attained/exceeded individual and territory sales quotas in a technical IBM systems environment

We're sold. And you will be too. Think of us as a twenty year old start-up company. You can enjoy all the excitement and rewards of ownership. It's a rare opportunity tailor-made for the entrepreneur. If you have a strong background in this challenging industry and are looking for a competitive salary and an excellent benefits package then join a leader. We are the BEST and only looking for the BEST! If this is you, then send your resume to:



**Ethlyn Cash, Computer Corporation of America,
4 Cambridge Center, Cambridge MA 02142**

NEW ORLEANS

Spicy! That's the flavor of New Orleans.

New Orleans provides its residents an enviable lifestyle. Great restaurants, a warm climate, and world renowned celebrations, such as Mardi Gras and the New Orleans Jazz and Heritage Festival have kept New Orleans the Queen city of the south.

But New Orleans is much more than a great place to live, it's a great place to further your Data Processing career. New Orleans is the home of MSU System Services, Inc., the technical service subsidiary of the Middle South Utilities System. MSU System Services offers excellent data processing opportunities at its New Orleans location. The current hardware environment consists of two IBM 3090/400's in an MVS/XA operating system environment supporting large IMS production applications.

SYSTEMS ENGINEERS

Analyst/Programmers—These positions involve the maintenance and enhancement of medium to highly complex applications utilizing high-level languages to develop multi-system interfaces and to provide production support. Job requirements are one to three years experience programming in COBOL and/or PL-1. Knowledge of OS/JCL, IMS, DB/DC, ADF, Mark IV, and dBase a plus.

Data Base Analysts—Working with state-of-the-art technology the selected individuals will be responsible for the design, implementation, tuning, back-up and recovery of IMS data bases. Two plus years experience as a DBA with a thorough knowledge of IMS concepts is required. Knowledge of DBRC and Fast Path is a plus.

MSU System Services, Inc. offers an exceptional relocation package including a relocation allowance (one month's salary) ... paid moving expenses ... paid house hunting trip ... Mortgage Interest Differential, plus Interim Living. For more information, call our toll free number below or send resume to T. Porter, MSU System Services, Inc., P.O. Box 61000, New Orleans, LA 70161.

1-800-231-4481

In Louisiana call collect (504) 569-4965



**MSU
SYSTEM SERVICES, INC.**

An Equal Opportunity Employer M/F/H/V

SOFTWARE OPPORTUNITIES

1-800-423-5383

1989 Salary Survey

Let our National Award winning computer specialists assist you in your search. We have over 300 affiliated offices around the country ready to work for you!

LIFE INSURANCE	To \$80K
UNIX INTERNALS	To \$60K
SYSTEM/36	To \$40K
IMS, IMS or ADABAS	To \$50K
P/A (COBOL or ALC)	To \$40K
UNIX/C	To \$55K
MVS or VM INTERNALS \$ OPEN	
ACF/VTAM/NCP	To \$50K
DB2/SQL	To \$60K
COBOL/CICS	To \$40K
Software Engineers	To \$60K
OVERSEAS	\$ Open

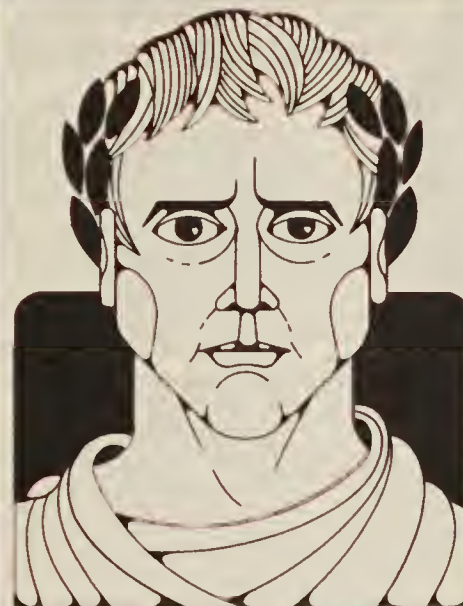
**ROBERT SHIELDS &
ASSOCIATES**
P.O. Box 890723, Dept. C
Houston, Texas 77289-0723

RPG PROGRAMMER/ ANALYST

FRANKFURT, WEST GERMANY

Opening for one RPG Programmer/Analyst with 3 to 5 years experience on the S/36 and S/38 or AS/400. Successful applicants will be able to analyze complex systems and code them in RPGII or RPGIII, work independently, and have excellent interpersonal skills. Civilian employment with the U.S. Army. Salary range is \$28,800 to \$38,000. Relocation paid. Many other benefits including tax-free housing allowance. This dynamic program provides the opportunity for professional advancement, travel, and security. Send resume to:

**U.S. Army Community &
Family Support Center**
2461 Eisenhower Avenue,
Hoffman Bldg I
ATTN: MWR Staffing Branch
(ARMP-CP)
Alexandria, Virginia 22331-0523
EQUAL OPPORTUNITY
EMPLOYER



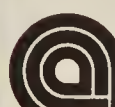
**Computer Professionals:
Some people came,
saw and conquered.**

So can you!

You can come to National Computer Associates. You can see legions of computer career opportunities, both locally and nationally. You can conquer the adversities to computer career advancement...with our help.

Our professionally experienced career consultants have provided powerful support to thousands of computer professionals resulting in career victories. We can do the same for you. Career advancement is greatly enhanced when put in the care of the professionals... those who have the: outstanding opportunities, the close contacts and the negotiating skills required. Even Caesar needed some help from his friends.

Come in. Call. Or mail your resume to the NCA firm nearest to you. There is no charge to you ever for all of our professional services. Confidentiality is assured. Now is the time to launch your victory campaign. Veni. Vidi. Vici!



**National
Computer
Associates**

ATLANTA: DataPro Personnel Consultants
400 Perimeter Center Terrace, Suite 650
Atlanta, GA 30346 (404) 392-4242
BALTIMORE: CIPS Inc.
101 W. Ridgely Road, Suite 7A & 8A
Lutherville, MD 21093 (301) 252-9000
BOSTON: Robert Kleven & Co., Inc.
P.O. Box 636
Lynnfield, MA 02173 (617) 861-1020
CHICAGO: Thomas Hirtz & Associates
150 North Wacker Drive, Suite 1700
Chicago, IL 60606 (312) 977-1555
CINCINNATI: Task Group
7875 Reading Road
Cincinnati, OH 45237 (513) 821-8275
CLEVELAND: Innovative Resources, Inc.
Staller Office Tower, Suite 426
East 12th & Euclid
Cleveland, OH 44115 (216) 621-4220
COLUMBUS: Michael Thomas, Inc.
450 W. Wilson Bridge Road, Suite 340
Worthington, OH 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants, Inc.
13355 Noel Road, Suite 2001
Dallas, TX 75240 (214) 661-8600
DENVER: Abacus Consultants, Inc.
1777 South Harrison Street, Suite 404
Denver, CO 80210 (303) 759-5064
DETROIT: Electronic Systems Personnel
3000 Town Center, Suite 2580
Southfield, MI 48075 (313) 353-5580
GREENSBORO: DataMasters
P.O. Box 14548
Greensboro, NC 27415-4548
(919) 373-1461
HARTFORD: Compass Incorporated
900 Asylum Avenue
Hartford, CT 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc.
1980 Post Oak Boulevard, Suite 1050
Houston, TX 77056 (713) 626-4100
INDIANAPOLIS: The Consulting Forum, Inc.
11711 N. Meridian Street, Suite 200
Carmel, IN 46032 (317) 843-5585
KANSAS CITY: DP Career Associates
8405 Metcalf, Suite 402
Shawnee Mission, KS 66202 (913) 236-8288
LOS ANGELES: Superior Resources Inc.
22653 Pacific Coast Highway, Suite 1-106
Malibu, CA 90265 (818) 884-3000
MIAMI: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, FL 33024 (305) 434-6112
MILWAUKEE: EDP Consultants, Inc.
Chancellor Park II, Suite 350
350 N. Sunnyslope Road
Brookfield, WI 53005 (414) 797-8855
MINNAPOLIS: Electronic Systems Personnel
880 International Centre
900 2nd Avenue South
Minneapolis, MN 55402 (612) 338-6714
NEW JERSEY: Systems Search
2040 Millburn Avenue
Maplewood, NJ 07040 (201) 761-4400
NEW YORK: Botal Associates, Inc.
7 Day Street, Suite 410
New York, NY 10007 (212) 227-7370
PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, PA 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
4725 North Scottsdale Road, Suite 209
Scottsdale, AZ 85251 (602) 274-6666
PITTSBURGH: KCS Computer Services, Inc.
400 Penn Center Blvd., Suite 320
Monroeville, PA 15135 (412) 823-8632
ROCHESTER: Traynor Confidential Ltd.
10 Gibbs Street, Suite 400
Rochester, NY 14604 (716) 325-6610
SAN DIEGO: Technical Directions Inc.
5005 Texas Street, Suite 304
San Diego, CA 92108 (619) 297-5611
SAN FRANCISCO: The Computer Resources
Group Inc.
303 Sacramento Street
San Francisco, CA 94111 (415) 398-3535
SEATTLE: Houser, Martin, Morris & Associates
110 110th Avenue N.E., C-90015
Bellevue, WA 98009 (206) 453-2700
STAMFORD: Hipp Waters Professional Recruiting
707 Summer Street
Stamford, CT 06901 (203) 357-8400
SYRACUSE: CFA Associates Personnel Inc.
5790 Widewaters Parkway
Dewitt, NY 13214 (315) 446-8492
WASHINGTON DC: Bill Young & Associates
8322 Professional Blvd. Drive 320
Fairfax, VA 22031 (703) 573-0200
AUSTRALIA: For information, contact the
NCA firm nearest to you

IBM 38/AS400

Programmers, Programmer Analysts with 1 year plus experience—Let us update you on the rapidly changing IBM 38/AS400 markets nationwide. To confidentially explore exciting new career opportunities rush a resume or call Deanna Gear.

**Dunhill of
Albuquerque, Inc.**

1717 Louisiana NE, Suite 218C
Albuquerque, NM 87110

505-262-1871

Exclusively Employer Retained



IT'S CALLED THE GOLDEN GATE FOR GOOD REASON

Systems professionals can discover career enrichment and personal satisfaction through the rewarding positions available with our prestigious clients. Logical Options and Sanderson Associates have merged forming Northern California's premier Search Firm

THE SEARCH FIRM, INC.

595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8632

Northern California

EXCLUSIVE POSITIONS

Contract & Permanent
IMS, CICS, IMS
VAX-RDB

- Sr. Prog. Analyst
- Sr. Bus. Analyst
- Project Managers
- Systems Programmers
- Data Base Analysts
- Technical Editors

Chuck Klein & Assoc.
3640 Thorson Dr.
Pacerville, CA 95067
(916) 844-8386

■ Sr. Systems Engineer ■ Sr. Systems Support Representative

StorageTek, one of the world's largest independent suppliers of information storage and retrieval systems, is expanding in the greater Philadelphia area. This has created opportunities to market and support our successful Automated Cartridge Library and extensive base of computer peripherals.

Individuals we seek must have 10+ years data processing experience to include 6+ years IBM MVS/XA, JES2 or JES3 systems programming experience. A Bachelor's degree or equivalent and excellent communications skills are required.

Senior Systems Engineer

Assist our customers and marketing representatives during the sale, installation and use of STK products. Responsibilities include use of software marketing aids; executive and technical level presentations; systems performance and configuration analysis; and preparation of technical content of proposals. Candidate must have experience with performance analysis and capacity planning.

Senior Systems Support Representative

Provide in-depth technical support to our customers and customer service engineers. Responsibilities include providing software support of MVS program products as well as using your system programming expertise to resolve hardware/software problems. You will also provide hands-on technical leadership and assistance to our customers during installation and use of STK products. Strong assembler experience a plus.

Our benefits rank among the best in the industry and we offer an outstanding compensation package. For immediate consideration, send resume, indicating position of interest, to: Ms. Phyllis Reiman, Systems Engineering Manager, or to Mr. Roy Marks, System Support Manager, Storage Technology Corporation, 111 Presidential Boulevard, Suite 209, Bala Cynwyd, PA 19004. We are an equal opportunity employer.

StorageTek

PICK PROFESSIONALS... The Ball Is In Your Court!

We're TECH DATA, a growth-oriented, future-directed organization that knows how to achieve success! Since our founding in 1974, we've become a leading national distributor of computers and related products, including printers, disk-drives, and local area networks, as well as equipment for desktop publishing and computer-aided design. From our nine regional distribution centers, located in key cities throughout the country, we provide our customers with prompt, efficient deliveries, and a wide range of information services.

Currently, we're seeking Pick Programmer Analysts and Pick Systems Programmers for challenging and rewarding opportunities at our new Corporate Headquarters complex in Clearwater, Florida. Located on an attractive 20-acre site, the two-building Tech Data Center, a non-smoking facility, features a food service operation, indoor and outdoor recreational facilities, and minutes away from the warm Gulf of Mexico beaches.

Take advantage of this great opportunity to join a team of success-directed professionals in a rapidly expanding organization!

Share in the success of an acknowledged leader in the distribution of computer-related hardware products. In addition to a highly competitive compensation and benefits package, that includes medical, dental and life insurance, local day care subsidies, stock ownership plan, and retirement program, we offer a stimulating technical environment, and ample opportunity for career development and advancement. For prompt consideration, send your resume in confidence to: Tom Ginnetti, Tech Data Corporation, 5350 Tech Data Drive, Bay Vista Business Complex, Clearwater, FL 34620.



Equal Opportunity Employer

SAY "YES" TO MICHIGAN!!!

Michigan is moving ahead with a strong, diversified economy, great quality of life and OPPORTUNITIES—opportunities to advance your career and participate in year-round activities such as boating, swimming, fishing, downhill and cross-country skiing, hunting, golf, spectator sports and cultural activities.

CONSULTANTS IN DATA PROCESSING, INC., a national software services firm, has career opportunities in southern Michigan working on exciting projects using state-of-the-art technology in pharmaceutical, healthcare, electronics, automotive and other industries. Our client community extends from the shores of Lake Michigan all the way across to Ann Arbor, Bloomfield Hills and the Canadian border.

Immediate openings exist for candidates experienced in:

COBOL	PL/1	CICS	IMS DB/DC
DB2	S/38	ADABAS/NATURAL	
CAD DESIGNERS		CATIA INSTRUCTORS	

We offer excellent compensation, comprehensive benefits, relocation assistance and a people-oriented management style. Call today or send your resume in confidence to: 30400 Telegraph Road, Suite 386, Birmingham, MI 48010.

(313) 644-3303

Call Collect

Consultants
in Data Processing
AN EQUAL OPPORTUNITY EMPLOYER INC.

THERE IS A DIFFERENCE

At Syntel the difference is a commitment to YOU!

- Career Opportunities
- Technical Training
- Salaried/Consulting Positions
- Strategic Career Development

Many of our Fortune 500 clients need your talents in:
IDMS/ADSO DB2/CICS/IMS DB/DC
TANDEM ALC, ACP/TPF

Explore the difference Syntel can offer. Call or write -

SYNTEL

5700 Crooks Rd • Troy, MI 48098 • 313-828-3290 FAX: 313-828-3307

AS/400 NO RESUME REQUIRED 800-874-9595

NPS

NATIONAL PROGRAMMING SERVICES, INC.

121 EXECUTIVE CENTER DRIVE □ SUITE 240
COLUMBIA, SC 29210 □ TELEPHONE 803-772-9412

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM Cobol mainframe applications; CICS; IDMS; IMS; ADABAS; ORACLE; DB 2; FOCUS; ADR DATA-COM; SAS; VM/CMS; S/38 RPGIII or COBOL; DEC/VAX COBOL or FORTRAN; HP3000; Series 1; Financial; Mfg.; Banking; Insurance; MSA; Point of Sale; MVS; VM, NCP/VTAM or CICS Systems Progs; DEC/VAX Systems Mgrs; Database Analysts; Data Security; Performance; Data Modeling. Partial listing of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 7
Raleigh, NC 27609
(919) 782-3024

PROGRAMMER/ANALYSTS & SYSTEMS PROGRAMMERS

FOR CAROLINAS AND SOUTHEAST

We have opportunities for on-line and database programmers for both in-house and consulting positions. Fee Paid. Please call or send resume to:

Kelth Reichle, CPC
Systems Search, Inc.
203 Heritage Park
Lake Wylie, S.C. 29710
803/831-2129

(Local to Charlotte, NC)

MIS Analysts and Programmers

KHP Services, Inc., a wholly-owned subsidiary of Pennsylvania Blue Shield, has several openings within its MIS Department for professionals with experience and qualifications in the following areas:

Assist in the systems analysis and design, system and user documentation and application development. Assist in the programming and testing.

- Applicants must have a minimum of 1 year of applications programming experience in a PICK environment.
- Well developed communications skills.
- Highly motivated.

Excellent corporate benefit package, working conditions, and upward mobility. An annual salary will be paid commensurate with experience. For prompt consideration, please contact:

C. William Eckenrode
Subsidiary Personnel Services Director
KHP Services, Inc.
c/o Pennsylvania Blue Shield
P.O. Box 62
Camp Hill, PA 17089
(717) 975-7375

PROGRAMMER/ANALYST

Allied Department Stores, a southeastern retail organization has an immediate opening for a programmer/analyst.

Challenging opportunity for a results-oriented individual with 3 years program design and systems analyst skills. Programming ability in RPG III & CPF as well as experience with the IBM System 38 is desired.

Excellent career opportunity offering competitive salary plus attractive benefits package including:

- Group Medical
- Profit Sharing Plan
- Dental Coverage
- Credit Union

Submit resume with salary history in confidence to:

Allied Department Stores

Human Resources Department
P.O. Box 2407
Savannah, GA 31402
(912) 236-1561
EOE M/F

Trend

Trend Has Immediate
Programming Opportunities
in Central Florida!

We're looking for the following backgrounds:

- Cobol, CICS, Command & Macro Level with Assembler
- Cobol, CICS, With Banking Experience
- Cobol, IMS, DB/DC
- System 38 With AS 400
- Cobol, CICS, IMS DL-1, PCS
- Unix & C, Assembler
- Customer Service Representatives to Support Software Systems
- Conversion Coordinator using Cobol for new Customer Data Mapping. Lots of customer interface.

For an immediate confidential interview, call Linda or Ruby at (407) 629-2700 or FAX resumes to (407) 629-2950. Mail resumes to Trend Technical Services, 1801 Lee Road, Suite 210, Winter Park, FL 32789

PROGRAMMER ANALYSTS

We have an urgent need for 20 Prog/Analysts, 1 Sys/Analyst, 2 Proj. Mgrs. and 2 DBA's with IDMS, ADS/O experience. Can accept other D/B experience instead of IDMS. All sunbelt locations with excellent companies. We also need experienced candidates with CICS, IMS DB/DC, DB2, ADABAS, ADR/DATACOM, SQL, S/38, DEC/VAX and many others. Both permanent and contract positions available. All fees paid. Salaries from \$28K-\$55K, depending on experience. Some positions qualify for annual bonus. CALL ME TODAY. JIM BOSTIC, PHILLIPS RESOURCE GROUP, P.O. BOX 5664, GREENVILLE, SC 29606 or call 803/271-6350 (days), 803/292-1181 (evenings), or FAX 803/271-8499.

PROGRAMMER ANALYST IBM AS400 SYSTEMS PREPARE NOW FOR HIGH INCOME POTENTIAL

- Hundreds of Positions Immediately Available
- State-of-the-Art Training
- Extensive Hands On
- Modern Facilities
- Limited Class Size
- Class Starts 3/13/89
- Outstanding Placement Services

Call Beth for more information at 1-808-649-9731

GREATER BOSTON AREA VAX SPECIALISTS

BOSTON and surrounding regions have multiple oppty's. for well-versed VAX/VMS developers. If you have solid VAX COBOL, FORTRAN, BASIC, Rdb, Datatrive, FMS & DCL skills, call us immediately! The VAX has penetrated fin'l. svcs. firms as well as manufacturers and software devel. cos. Call Data Processing Division (in confidence), Robert Half of Boston, Inc., 101 Arch Street (32 Summer Street), Boston, MA 02110. Tel. 617-951-4000. Personnel Consultants. Client company assumes all fees.

NORTH CAROLINA'S BEST OPPORTUNITIES IN DATA PROCESSING

Confidential

Our professionals can help you find the best career opportunities in North Carolina's growing data processing industry. Our clients are the top companies in the state. Call or send your resume to Michael LaVallee.

ROMAC

Two Piedmont Plaza
2000 W. First Street, Suite 701
Winston-Salem, NC 27104
(919) 725-1933

COMPUTER PROGRESS CORPORATION \$40,000 to \$80,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for Programmers and Analysts in Kentucky, Ohio, Indiana, and Tennessee with one of the following skills:

NATURAL ADABAS

Send resume or call.
Computer Progress Corp.
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533

COMPUTER PROGRAMMERS New York Area

Positions available for professional computer programmers with three or more years experience in a corporate mainframe environment

- Ingres & IBMS
- SYBASE
- Jr VAX Sys
- Dbase III
- Paradox
- Sun UNIX "C" w/Sun Views
- Adm. Sys. Analyst Coord. VAX
- Lotus Multimate Smart Com
- Unix "C"
- Focus-TSO
- CICS-Assem
- Oracle "C"
- Tech Writer

Please Call: (203) 375-9264
or FAX (203) 375-4925
or send resume to:
SACCO ASSOCIATES
P.O. Box 1136
Stratford, CT 06497-1136

TRY OUR 24 HOUR ON LINE DP JOB LISTINGS

**CALL
919-222-0979**

DP RESOURCES, INC.
P O Box 5057
Burlington, NC 27216-5057

FLORIDA PROGRAMMER ANALYST

To \$40,000. Our client, a supplier of revolving credit software applications requires 3+ years COBOL, 2+ years CICS command level, plus 2 years VSAM with financial, banking, A/R or retail applications. Will install software on customer sites. 40% travel. Multiple openings in rapidly growing IBM mainframe environment. Reply in confidence to David Leggett.

FOX-MORRIS
409 Washington Ave., Suite 704
Towson, MD 21204
(301) 296-4500

LIBERTY TRAVEL

invites you to

Design
Custom
Travel
Systems**LINC**Implement
on
UNISYS
A-Seriesup with the
LEADER**We need Linc II and DMS II
SOFTWARE SPECIALISTS**

Opportunity for Growth - Competitive Salary

Comprehensive benefits including Travel and Bonus Programs

Send resume and salary requirements to: Mr. W. F. Hughes

Liberty Travel, Inc., World Headquarters,
69 Spring Street, Ramsey, N.J., 07446-0507**DATA PROCESSING
PROFESSIONALS**

Become a member of the team who has made the INC.500 for the third year in a row! Enjoy state-of-the-art environment and challenging assignments with one of the Southeast's fastest growing consulting firms. Our offices are located in NASHVILLE, TN; COLUMBIA, SC; CHARLOTTE, NC; and ATLANTA, GA.

Current openings for professionals with 2 or more years experience include:

DEC
• FORTRAN, RDB
• VMS, DECNET
• SYS MGR ALL-IN-ONE
• COBOL, DBMS 32
• VAX, PDP, DCL, FORTRAN
• NATURAL/ADABAS
• Q or L CLEARANCE

IBM
• NATURAL/ADABAS
• CICS
• IDMS, ADS/O, CMS
• CICS, DL/I
• CICS, IDMS, ADS/O

We offer excellent salaries and benefits. Call or send resume to our Corporate Office TODAY!



**AMERICAN
COMPUTER
PROFESSIONALS**
P.O. Box 5125
Columbia, SC 29250
(800) 332-0555

equal opportunity employer

**A Terrific
Opportunity**

Computer Consulting Group, one of the Southeast's fastest growing contract programming and consulting firms, has immediate openings for talented Programmer/Analysts with 2 or more years experience. Excellent salary & benefits package. We're especially seeking:

DEC/VAX/MANUF
IDMS/ADSO MANUF
NATURAL/ADABAS
VAX/COBOL
VAX/FORTRAN
WANG/COBOL
HP/TRANSACT
VAX/RDB
538/RPGIII
IBM PC/C/UNIX
IBM PC/COBOL
OS/MVS/DB2
COBOL/CICS
HP 1000/FORTRAN
DEC/PDP/RSX
VAX SYS MGR
TECH WRITERS
HP COBOL
MVS/FOCUS
IBM/DEC/RACF

**Computer
Consulting
Group**

Contract Professional Services

Research Triangle Area
4109 Wake Forest Rd.
Suite 307
Raleigh, NC 27609
1-800-222-1273

OAO**SUNBELT EMPLOYMENT
OPPORTUNITIES**

OAO Corporation, a leading independent information services company in the computer services industry, has openings at Arnold Engineering Development Center (AEDC) located in the TVA lake region of middle Tennessee.

A mild, four seasons climate provides opportunities for outdoor sports activities including boating, fishing, hunting, and camping. The AEDC location offers small town benefits with cosmopolitan accessibility. The area has low cost housing, no state or city income tax, highly rated primary and secondary school system and opportunities to earn advanced degrees at nearby graduate educational facilities.

OAO is seeking qualified professionals for the following positions:

• MIS PROJECTS MANAGER

- BS/BA Computer Science or related fields
- 15 years experience in Business Systems Development
- 7 years management experience
- Knowledge of 4GL and relational database environment
- Systems Integration Experience Essential
- Excellent Interpersonal Skills

• PC MANAGER

- BS Computer Science or equivalent
- 8 years experience in PC business use
- Well versed in use of MS DOS, PC Networking and various off the shelf PC application software
- Knowledge Processing Environment
- Hardware/Software knowledge
- Communications/Connectivity knowledge

OAO offers job stability, career challenges, competitive salaries, and an excellent benefits program, including relocation expenses. Mail your resume and salary requirement in confidence to Peggy F. Lewis, Personnel Administrator,

OAO CORPORATION

Mail Stop 100

Arnold Engineering Development Center
Arnold AFB, TN 37389-9998

An Equal Opportunity Employer M/F/H/V

ATLANTA & SOUTHEAST**\$25,000 to \$95,000**

**IDMS/ORACLE/DATACOM/IMS/DB2/SYS 38
VAX/MAPICS/FOCUS/CAD/CAM/CAE
TECHWRITERS/DP SALES/IDMS**

Need Programmers, Programmer/Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:

Jim Heard, EDP Consultants, Inc.
3067 Bunker Hill Road, Suite 202
Marietta, Georgia 30062

FAX:
404-973-4052

PHONE:
404-971-7281

Why Spectrum?

Because you want a company that has a good reputation... and deserves it.

Because you want a company that keeps faith with employees, and earns their loyalty.

Because you want a company that offers stability and opportunity for growth.

We have opportunities now for professionals with experience in:

- Management Consulting
- Technical Services for IBM, DEC and AT&T environments—data base application design, systems software, relational technology and data communications
- Project Management
- Commercial education in MVS and UNIX environments

We're ready to give you many more reasons why Spectrum is the company you want. Call or send us your resume.

New Jersey

Judy Dirk, (201) 725-4000
1250 Route 28, P.O. Box 5365
North Branch, NJ 08876

Philadelphia

Joe Gross, (609) 779-2626
1040 N. Kings Hwy., Suite 617
Cherry Hill, NJ 08034

Washington, DC

Jill Camp, (301) 424-9196
51 Monroe Street, Suite 1210
Rockville, MD 20850

Florida

Terry Wilkes, (407) 682-1300
1110 Douglas Ave., Suite 2040
Altamonte Springs, FL 32714



SPECTRUM
Technology Group, Inc.

An Equal Opportunity Employer M/F

**SYS 38/
MAINFRAME \$50,000**
Large oil and gas company in Houston seeks a degreed individual with IBM System 38 experience. Position involves mainframe interfacing and financial applications, with an excellent opportunity for advancement. Excellent benefits and relocation package.

**PROGRAMMER/
ANALYST \$35,000**
Medium size company in a medium size city in SE Texas is looking for an IBM mainframe programmer analyst with an OS/MVS background. Must have at least 3 years of COBOL and CICS. This beautiful city is minutes off the Gulf and minutes from some of Texas' finest resort lakes. Excellent benefits and relocation package.

LAN \$60,000
Dynamic Houston based corp. has urgent need. In-depth knowledge of LAN required. Novell training classes a plus. Comp. will relocate.

SYS 36 \$45,000
Major Houston corp. seeks Assistant P/L. Individual will promote to P/L after 15 mos. 5-7 yrs. solid 38, RPGIII & a degree required. Company will relocate.

DDA \$60,000
National corp. seeks Sr. Deposits Analyst. Client requires in-depth knowledge of DDA & COBOL. Company will relocate.

ROBERT HALF

DATA PROCESSING
1360 Post Oak Blvd.
#1470
Houston, Texas 77056
800/356-1994

SO. CAL.**—Immediate Contracts**

- Commercial Loans
- CA Financial PKgs
- IMS DB/DC MSA
- ADABAS NATURAL
- TANDEM SQL
- Sys 36 DMAS
- ISI Payroll
- STRATUS
- CATIA
- ADA Secret Clearance
- DB2 DBA

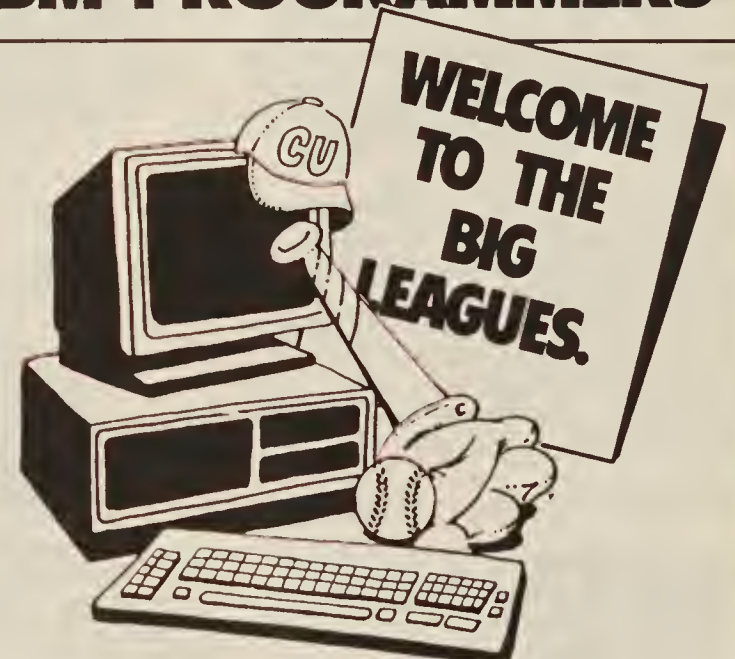
—Short and Long Term

PCR
THE PEOPLE COMPANY

200 Corporate Pointe, Suite 465
Culver City, CA 90230-7613

1(800) 537-3620
(Outside CA)
(213) 568-1030
(Within CA)

IBM PROGRAMMERS



THERE'S A NEW TEAM IN FOXBOROUGH

If a state of the art environment **MVS/XA/ESA**, JES-2, SDSF, TSO-E, is what you are looking for, and you are excited by leading edge technology, then Commercial Union is your road to success.

In business since 1861, we thrive on team effort and promote from within. CU is hiring **IBM PROGRAMMERS** who have the following qualifications:

- 1 to 9 years' Data Processing experience
- COBOL ■ NATURAL/ADABAS
- CICS ■ MVS Systems
- VAX/VMS Systems
- JCL, Utilities, IDCAMS

Commercial Union offers excellent benefits which include a discount on your personal insurance, life, health, dental insurance, savings and pension plans, plus tuition reimbursement. **Interested applicants should send their resumes to Carol Yellen, B08-06.**

CU Insurance

One Beacon Street, Boston, MA 02108

An Equal Opportunity Employer

The largest bank holding company in the Southeast, NCNB, is currently seeking experienced, knowledgeable data processing professionals for exciting opportunities in Tampa, Florida and Charlotte, North Carolina.

PRODUCTION CONTROL - TAMPA

In this newly-created management position, you will develop a formal storage administration area that involves a combination of production control and technical services through the use of DASD packages.

The well-organized, innovative individual we select will possess a strong technical background in production control. A Bachelor's degree in Computer Science, Business Administration or Math is preferred, and appropriate equivalent experience is acceptable. A minimum of 3 years experience using DASD 3380 support and tape management utilizing CA-1, ICF catalog support, DFHSM, DASD performance and capacity management is required. Management experience is a must.

Please send your resume for the Production Control Manager in confidence to: Cathy Jarvi, NCNB, P.O. Box 31590, LKSD1-3, Tampa, FL 33631-3590.

PROGRAMMER ANALYSTS - CHARLOTTE

NCNB is also recruiting for Programmer Analysts with 2-5 years of COBOL programming experience on a large IBM mainframe. Exposure to banking applications, IMS and MVS/XA is desired. Please send your resume for the Programmer Analyst in confidence to: Kim Tripp, NCNB, 1 NCNB Plaza, T12-2, Charlotte, NC 28255.



We offer a highly competitive compensation and benefits package, a stimulating technical environment and the opportunity to maximize your professional potential. EOE

The City of Fort Myers, Florida is recruiting for the following positions:

M.I.S. MANAGER

Technical and managerial responsibilities in planning and directing a medium centralized data processing organization. Must have previous management experience with 3 years in PICK operating systems. Competitive salary commensurate with experience.

PROGRAMMER/ANALYST

Technical work in analysis, design and programming. Must have minimum of years PICK experience and working knowledge of DATA/BASIC. Competitive salary commensurate with experience.

Send resume to:

Director of Personnel
City of Fort Myers
P.O. Drawer 2217
Fort Myers, FL 33902

EOE

DATA PROCESSING PROFESSIONALS

WESSON, TAYLOR, WELLS

We are a major national contract programming and consulting firm experiencing continued dynamic growth. We have numerous, exciting and challenging opportunities for individuals with AT LEAST 2 years experience in the following disciplines:

IBM: DB2, TELON, IMS, ADABAS/NATURAL, CICS
DEC: RDB, ORACLE, INGRES, DBMS, FORTRAN
H-P: POWERHOUSE, TRANSACT, PROLOS, SPEEDWARE, MM/3000, CUSTOMIZER

We offer an excellent compensation and outstanding benefit/incentive plans. Relocation assistance is also available. For more information, call Paul Clifton at (800) 982-4463. To apply, send your resume to:



WESSON, TAYLOR, WELLS,
Dept. W-3, P.O. Box 1587,
Camden, SC 29020. An Equal Opportunity Employer, M/F.

We PICK the Best

Cogent Information Systems, Inc. is the premier provider of high quality software and services dedicated to the needs of Prime INFORMATION, Revelation and Pick users.

Cogent is committed to developing a technically superior staff to meet the challenges of a full service consulting and software development company. Cogent has several exceptional career opportunities available. All positions require at least two or more years experience with Prime INFORMATION, Revelation or the Pick Operating System.

Positions available include:

- ◆ Programmers
- ◆ Programmer Analysts
- ◆ Project Leaders
- ◆ Pick Instructor
- ◆ Technical Sales Support

Cogent offers competitive salaries, excellent benefits, and tuition reimbursement. For immediate and confidential consideration, please send resume and salary history to:



COGENT™
Information Systems, Inc.

Human Resource Department
70 Hudson Street, Hoboken, NJ 07030

HITECH OPPORTUNITIES

Top DP placement agency has 100's of MD, VA and U.S. wide openings for experienced professionals. Our clients include small, mid-sized and large commercial and defense firms. They offer excellent benefits and advancement. Some "hot" current openings include:

IBM SYS PROGRAMMERS To \$60K	OB2/SQL	Call
COBOL/CICS To \$48K	REAL-TIME SW	To \$60K
ADABAS/NATURAL To \$48K	IMS DB/OC	Call
UNIX/C To \$45K	IMS/AS/O	To \$50K
IBM TELCOM SPEC	Call	ORACLE
IBM ASSEMBLER To \$48K	IBM RPG III	Call

BILL YOUNG & ASSOCIATES

8322 Professional Hill Dr. • Fairfax, VA 22031
(703) 573-0200 (24 hr. answering)

"MEMBER OF NATIONAL COMPUTER ASSOCIATES"

SOFTWARE ENGINEERS

SMC Real Time Systems, a leading software systems house, is seeking Software Engineers with a proven track record in software design and implementation. The successful candidates will have working knowledge of INTEL 8086/80286, Motorola 68000, and IBM PC, with emphasis on Assembler, C, ADA, and PASCAL. DOD background is: 1750A, JOVIAL, 1553 Bus would be a plus. 3 - 8 years hands on experience is required. Forward your resume with salary history to: SMC Real Time Systems, P.O. Box 190, Middlebury, Connecticut 06762.



SMC Real Time Systems

A Division of Science Management Corporation



COMPUTER PROFESSIONALS

MSI, in response to growing client requests, is seeking ambitious DP Professionals to support our three business thrusts of:

- Data Processing Consulting
- Contract Programming
- Custom Software Development

POSITIONS TO \$50,000
LEARN DB2

Most assignments are 1 to 2 years in duration and involve large IBM Mainframe, Database and Data Communications development projects utilizing leading edge software systems and 4GL's.

Send your resume to:
Management Solutions Inc.
1416 South Third Street
Louisville, KY 40208

MVS/XA System Programmer

Large corporate state-of-the-art data center located in South Central Virginia has an immediate requirement for motivated technical professional with a minimum of 3 years experience in MVS Systems Programming.

Person must have completed a CBIPO and have SMP/E, CICS & JES2 installation experience. Other responsibilities of this position include maintenance and installation of the following products: Omegamon, TSO, CA-1, CA-7, CA-8, CA-11, ROSCOE, Librarian, FDR, Syncsort, BEST/1, SAS & ACF2.

A competitive salary, excellent benefit and standard relocation package is offered. Principals only should send resume and salary history in confidence to:

CW-B5130
Computerworld
Box 9171
Framingham, MA 01701-9171

Computer Analyst

Must be able to determine hardware & software requirements of clients; direct preparation of systems studies, analysis & detailed proposals for the development of application systems, including supervision of EDP staff in installation, maintenance & software design. Monitor & evaluate technical capabilities & performance of EDP staff assigned to client account. Detect, diagnose & correct problem areas. Development of inventory securities and control systems. Use of IBM mainframes, TSO/ISPF, LIBRARIAN, IMS DB/DC, Screen-printer, Dialogue Manager. Bachelor's degree in Computer Science, Electrical Engineering, Mathematics or related degree. Minimum of 2 years experience in job offered or two years experience in Software Design Database development experience with languages as above. Six years experience in job offered accepted in lieu of degree or 4 years experience with Associate Degree. No experience required with advanced degree. 40 hours per week; \$55,000 per annum.

Please send resumes to: State of New York Department of Labor, Room 501, One Main Street, Brooklyn NY 11201, Attn: PM 695. An Equal Opportunity Employer.

Recruit qualified computer and communications professionals with the IDG Communications Computer Careers Network of five leading computer newspapers.

Call
Lisa McGrath at:
(800) 343-6474
for more details.

It's the efficient way to recruit qualified computer professionals.

Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

You choose the newspapers. Depending on who you're looking for, you can select the combination of five newspapers that best suits your needs - **Computerworld**, **InfoWorld**, **Network World**, **Digital News**, and **Federal Computer Week** Editions.

You choose the region. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Of course, national buys of individual newspapers or various combinations are also available when you need to extend your reach.

You don't pay for readers you don't want. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network puts you in touch with qualified computer professionals - and only those qualified computer professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Classified Advertising Director, at (508) 879-0700.

Sales Offices:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (508) 879-0700;

NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350;

WASHINGTON: 8304 Professional Hill Drive, Fairfax, VA 22031, (703) 573-4115

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433;

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164;

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, (714) 250-0164;

SEARCHING FOR EXCELLENCE

IN
HOUSTON LOS ANGELES CHICAGO
BOSTON KANSAS CITY NEW YORK ALBANY

Polaris Consulting Services, Inc. is renowned throughout North America for its database and 4GL expertise in developing Strategic Information Systems.

Our new locations, continuous growth, and expanding client base has created an unprecedented demand for quality data processing personnel.

We provide challenging full-time employment opportunities with top salaries, excellent benefits, specialized training and a successful career development program.

Polaris requires that candidates have excellent communication skills, a minimum of 3 years data processing experience, and a strong background in Online Database Management Systems.

We have immediate openings for Project Managers, Systems Analysts, DBAs, PAs and Programmers with solid experience in one or more of the following:

- DB2, SQL/DS
- CSP, AS, QMF
- IDMS ADS/O
- MODEL 204
- FOCUS
- COBOL
- ORACLE
- APS
- CICS

If you are creative, self-motivated and looking for a challenging career, send your resume to:

POLARIS CONSULTING SERVICES, INC.
c/o Steve Newman
1225 North Loop West, Suite 827
Houston, Texas 77008

EQUAL OPPORTUNITY EMPLOYER

POLARIS
Information Systems Professionals

OVERSEAS EMPLOYMENT OPPORTUNITIES

The following positions are open to work on an information systems development project for a large university. Interested candidates with the experience and qualifications specified below may send resumes to:

Dr. Faisal Tamimi
SAUDOS Project
c/o K. Forsyth
Academy for Educational Development
1255 23rd Street, N.W. - Suite 400
Washington, D.C. 20037

MVS System Programmer - Direct MVS system support experience including system and application installation and generation, DASD configuration, TSO and CICS support, JCL support for application development and system maintenance, and system tuning and performance control.

VTAM/NCP Network Manager - Direct support experience of VTAM/NCP in an SNA environment including VTAM/NCP installation and generation, IO devices configuration and definition, network problem definition, and network performance monitoring and control.

IDMS DBA - Minimum of 5 years direct support experience of IDMS including all database administration functions - database design requirements definition, design (conceptual and physical), implementation under IDMS/R, IDMS installation and generation, database tuning and performance control, database restructuring.

Senior Systems Analyst - 5 years of experience in large online application development in an MVS/IDMS environment including requirements definition, design, implementation, testing, and documentation.

Programmer Analyst - 4 years of experience in large online application development in an MVS/IDMS environment including design, implementation and testing using ADSO and COBOL.

C Programmer - At least 4 years of direct C programming experience in DOS 3.x environment including device drivers, graphics, etc. Experience with MS DOS BIOS and internals is a must.

Salaries and benefits depend on qualifications and experience. Candidates should be willing to relocate overseas.

Systems Engineer to \$45,000

Leading research firm seeks talented systems professional with heavy emphasis in technical support, software quality assurance, and software maintenance of molecular modeling packages in a technical network environment. You will support VM, MVS and VAX/VMS systems and high-end graphic workstations. There will be extensive interface with users and vendors. BS in Chemistry, Engineering or Computer Science is required. Outstanding benefits.

ROBERT HALF

DATA PROCESSING
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535
FAX: (314) 727-1321

Computer Information Systems

Assistant Professor, beginning September 1, 1989 (pending budget approval). Full-time, tenure-track, to teach courses in programming, computer hardware organization, data communications and operating systems. Duties to include student advisement, committee assignments and appropriate scholarly activity. Earned doctorate preferred, plus significant practical experience with commercial computer applications. Teaching experience desirable. Salary negotiable. Deadline for application is April 1, 1989. Send letter of application and resume to:

Dr. Lawrence Scott, Chair
Information Systems Department
Chase Hall 201
State University College
1300 Elmwood Avenue
Buffalo, NY 14222
(An Equal Opportunity/
Affirmative Action Employer)

INFORMATION SYSTEMS/
DATA PROCESSING

CONSULTANTS TO \$65K+

Major corp has immediate need for seasoned systems professionals.

Regions/Locations:

- East Coast
- West Coast
- Mid West

Background/Experience:

- CASE Tools
- Structured Methodology
- IBM Mainframe S/W

Duties/Responsibilities

- Training
- S/W Review
- Planning

For additional information/consideration by our client please contact

Mr. Al Valentino
BANNER SERVICES
1301 W. 22nd Street
Oak Brook, IL 60521
(312) 574-9499

PICK PROGRAMMER/
ANALYSTS

Advantage Information Mgt. Services, Inc. has openings for two self-directed, highly motivated programmer/analysts with PICK experience (VIMARK, UNIX OS help). Position in Product Development Dept. requires manufacturing background. Position in Customer Service Dept. requires programming management experience.

We perform continuing development and maintenance on fully-integrated systems for the food distribution and processing industries.

A fast-growing company located in Phoenix, Arizona, we offer an upbeat, friendly working atmosphere, unlimited opportunity, diversity, and an above average salary. Send resumes to: Advantage Information Mgt. Services, 4222 N. 12th Street, Suite 200, Phoenix, AZ 85014

Data Processing
PROGRAMMER/ANALYSTS
and
* SR PROG/ANALYSTS *

We have several immediate openings in the Seattle, Washington and D.C. areas for programmers with experience in:

- MS-C, WINDOWS SDK, SQL
- STRATUS/SYS 88
- SYS 38/AS400

Please call or send resume to:

Western Data
1200 112th Ave. N.E.
#C-115, Bellevue, WA 98004
(206) 453-1540
Attention: S. L. Jason

"Get on with it."

That's how we do business at Teradata.

We're a company that's on the move. And we like to get things done. Quickly. Without a lot of endless meetings and memos and review.

It has worked. We are responsible for some of the most advanced relational database management systems in the world. And if you think this kind of high-tech lead can mean a great career opportunity for you, you're right.

System Engineers

Right now, we're looking for some dynamic System Engineers in our field offices in:

Atlanta	Detroit	New York
Chicago	Houston	Orlando
Cincinnati	Los Angeles	Tulsa
Denver	New Jersey	Washington, D.C.

You will provide the information and support necessary to our clients and prospects to help sales of our products, as well as ensuring product satisfaction. This will include assisting marketing representatives in pre-sales activities, developing customer support plans, installation and demonstration of products, ongoing consultation, education, evaluation and recommendations for existing clients.

You should have a solid knowledge of database management, programming, hardware and software systems, and at least 3 years experience with MVS. Knowledge of one of the following is also desired: VM, DB2, SQL/DS, IDMS/R, Datacomm/DB, UNIX/UTS, IMS, ADABAS, and Model 204. A Bachelor's in computer science or equivalent experience is required. Vendor experience is a plus. Good communication skills and 30% travel are both expected.

This is the kind of challenging position handled best by people who are self-motivated and who like to solve problems in a fast-moving environment.

If you would like to get on with it, too, forward your resume, noting preferred location and salary history, to: Phil Barquer, Field Operations, Teradata Corporation, Dept. CW-12, 12945 Jefferson Blvd., Los Angeles, CA 90066. Equal Opportunity Employer. Principals Only Please.

Teradata
Get on with it.



UNIVERSITY OF
OKLAHOMA HEALTH
SCIENCES CENTER

ASSISTANT DIRECTOR OF
MICROCOMPUTER AND
DATA COMMUNICATIONS

Excellent opportunity now available for individual to define and administer the Campus wide microcomputer support and Data communications support including: hardware and software maintenance; data communications between microcomputer networks; data communications between campus and off-campus entities and consultation with faculty, staff and administration regarding the proper integration of computing into the work environment. Requires Bachelor's degree in related field (i.e. computer science, electronics, etc.) or equivalent experience. Five years experience in the maintenance, design of microcomputers, data communications equipment. Prefer: Supervisory experience, convergent technology experience. Salary negotiable. Please submit application/resume to: University of Oklahoma Health Sciences Center, Personnel Services, P.O. Box 26901, OKC, OK 73190.

AFFIRMATIVE ACTION
EQUAL OPPORTUNITY
EMPLOYER

FLUOR DANIEL

PROGRAMMERS &
PROGRAMMER/
ANALYSTS

Fluor Corporation is the largest publicly traded, international engineering, construction, maintenance and technical services company based in the U.S. Fluor Daniel, the company's principal subsidiary, is proud to have provided the above services to over 80% of the Fortune 200 companies and to be ranked #1 in ENR magazine's listing of the world's top 400 contractors.

We have immediate openings for Programmers and Programmers/Analysts in Greenville, SC with 1 or more years experience using C programming language in a DEC VAX VMS environment. Experience with INGRES or other RDBMS highly desirable.

We invite you to explore the possibilities of joining our team of professionals and continuing your growth with the industry leader. Send your resume in complete confidence to: Joan Chastain, FLUOR DANIEL, Daniel Building-DBGAA, 301 N. Main St., Dept. 3-1204, Greenville, SC 29601-2170. An equal opportunity employer M/F.

Data Processing



DSM

DIAMOND-STAR MOTORS

NEW PLANT - NEW CAR
NEW CAREER
POTENTIAL

Diamond-Star Motors Corporation, a Chrysler-Mitsubishi joint venture in Bloomington-Normal, Illinois, is seeking qualified candidates for its new automobile manufacturing facility.

SYSTEM SOFTWARE
ANALYST

This position will provide the technical support required for an IBM/370 MVS/XA operating system environment running NCP/VTAM with NETVIEW, plus CICS and IMS DB/DC on line applications.

Candidates having four years general experience with this software or detail skills in one of these software areas will be considered. The candidate will eventually be trained in all systems software for back up purposes.

A bachelor's degree is preferred and experience in a start up data processing operation is a definite plus. Mail resume and salary history to:

Recruitment and Placement SSA

DIAMOND-STAR MOTORS CORP.

100 N. Diamond-Star Parkway
Normal, IL 61761

No Phone Calls Please
Equal Opportunity Employer

Are You Keeping Up with 1989 Salary Increases?



Just Published—Free!

Our new Salary Survey is the best way you can keep up with new trends in compensation, technical developments that impact careers, computer career planning and more.

The Survey reviews the latest salaries and career paths for over sixty computer job functions and experience levels. Specifically, you'll learn about which computer careers offer the most salary and career potential; how to assess your current position; what you can do to avoid career dead-ending and the six steps to computer management.

Call 1-800-848-0040, ext. 113
(In Canada call: 416/977-7957)

Call anytime 7 days a week for your free copy. Or, write: P.O. Box 7571, Department NK13, San Mateo, CA 94403-7571. (If you write to request a copy, please include your position title.)

source edp
Computer Recruiting Specialists
Client companies assume our charges

RESEARCH ASSISTANT SYSTEMS ANALYST/PROGRAMMER

The Texas A&M Ocean Drilling Program (ODP) has an opening for a systems analyst/programmer in the Data Base Group. Responsibilities will include designing, and building enhancements to a large-scale geological database system. These enhancements include user friendly data retrieval applications, data entry applications for some datasets, a dialup data retrieval system designed for inexperienced users, and the future transfer of data to CD-Rom. Close cooperation and coordination with other ODP programmers building enhancements will be required.

Applicants need at least a Bachelor's Degree in computer science, proven experience in designing large-scale information systems, VAX programming experience, and some experience with a database system (preferable S1032) and spreadsheet systems. Experience with on-line access systems design, CD-Roms, supervising programming projects, and/or micro-computer programming is preferred. A background in geology is desirable.

This position is available immediately, and will be filled as soon after the closing date as possible. Salary will be commensurate with qualifications and experience of applicant. Applicants should forward a resume and names and addresses of three references to:

Employment Manager
Personnel Department
Texas A&M University
YMCA Building
College Station, TX 77843
Equal Opportunity Employer

Closing date for applications is March 10, 1989.

NCSA Research Programmer (Graphics)

Graphics software development for interactive scientific visualization. Including, but not limited to PHIGS+ applications. Provide support and advice to applications programmers. Participation in the design and implementation of high-performance computing systems for the Research in Interactive Visual Environments (RIVERS) project.

Qualifications: B.S. in computer science or related field is required. Professional experience is extremely helpful. Good working knowledge of UNIX, C, and FORTRAN and experience in scientific visualization and/or advanced graphics rendering is essential. Experience with CONCENTRIX, SUN UNIX, and UNICOS is desirable. Experience with hardware-oriented graphics languages, PHIGS+ in particular, is especially desirable. Experience with The X Window System and/or NeWS, as well as networks and distributed computing environments, and object-oriented programming concepts is also desirable. The successful applicant should have the ability to work in a goal-oriented team of scientists and computer professionals. This is a 12-month, 100%-time appointment with regular University benefits. Salary range is \$30-35,000. Starting date negotiable.

To ensure full consideration, please send letter of application, resume, college transcripts, and three letters of recommendation by **March 24, 1989** to:

Joseph Hardin
National Center for Supercomputing Applications
152 Computing Applications Building
605 E. Springfield Ave.
Champaign, IL 61820
(217) 244-6095

The University of Illinois is an Affirmative Action/
Equal Opportunity Employer



Get in on the ground floor with a leader in the new rapidly expanding videotex information services industry. U.S. VIDEOTEL, INC., a young, dynamic, videotex company, is seeking skilled people for significant expansions. Knowledge of C programming language in a Unix environment is required to develop business systems, videotex services, and videotex tools. The following openings offer an opportunity for professionals to work in an environment of rapid growth and challenge:

PROGRAMMER/ANALYSTS: 3-5 years programming background with significant C language experience in a Unix environment. Specific application experience is less important than technical competence. C/Unix in a multi-user machine environment is essential.

SYSTEMS ANALYSTS: 5+ years programming and design background with significant C language experience in a Unix, multi-user environment. Strong user-interface and communications skills are essential.

PROJECT MANAGER: Minimum eight years in software development with C/Unix experience in a multi-user environment. Strong project management, user-interface, communication and people skills required.

Come to Houston and participate in the resurgent economy in one of the premium cities in the Sunbelt. U.S. Videotel offers a comprehensive benefit and compensation package. For immediate consideration, send resume with salary history to:

DIRECTOR OF PERSONNEL
U.S. VIDEOTEL, INC.
5555 SAN FELIPE, SUITE 1200
HOUSTON, TEXAS 77056
An Equal Opportunity Employer

Experienced Pick Analysts

Colorado

Join a progressive technical organization. Design, code, customize, implement, & support PICK-based applications. Project management or systems analysis experience preferred. Outstanding compensation & benefits package. Send resumes to:

Aurotech
5445 DTC Pkwy., #900
Englewood, CO 80111

It's the efficient way to recruit qualified computer professionals.

Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

You choose the newspapers. Depending on who you're looking for, you can select the combination of five newspapers that best suits your needs - **Computerworld**, **InfoWorld**, **Network World**, **Digital News**, and **Federal Computer Week Editions**.

You choose the region. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Of course, national buys of individual newspapers or various combinations are also available when you need to extend your reach.

You don't pay for readers you don't want. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network puts you in touch with qualified computer professionals - and only those qualified computer professionals you need to reach.

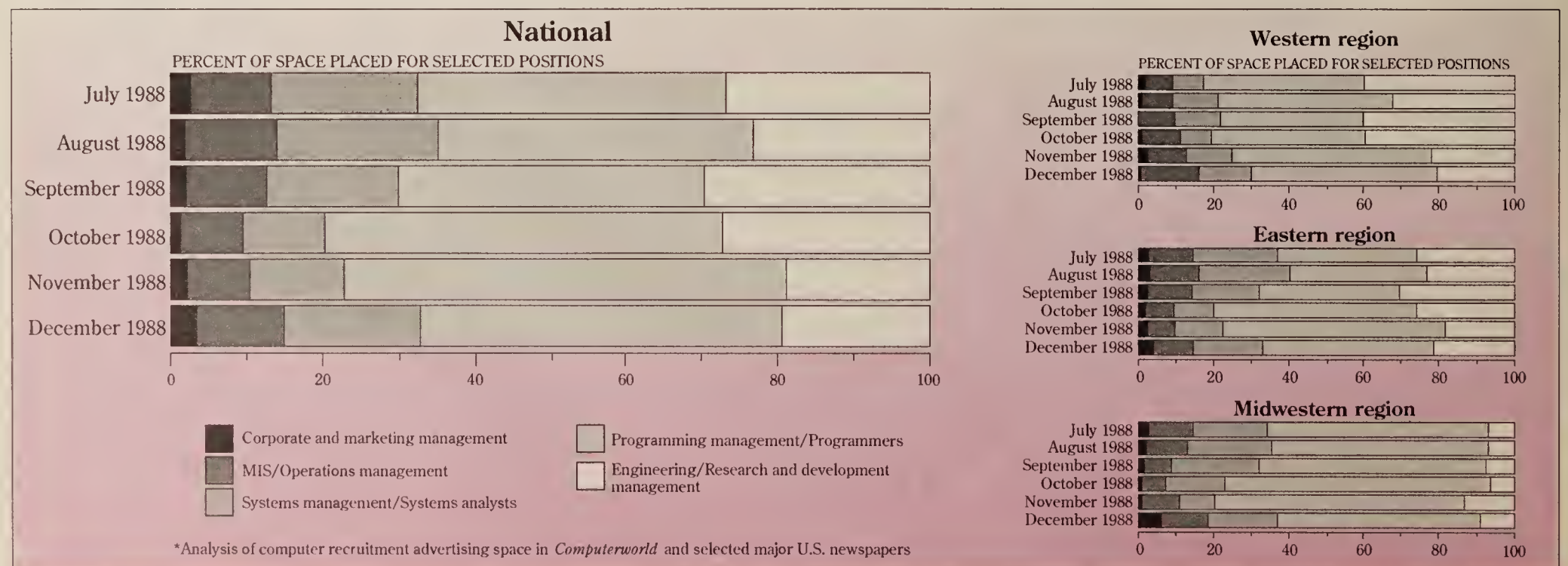
To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Classified Advertising Director, at 508-879-0700.

Sales Offices: **BOSTON:** 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (508) 879-0700; **NEW YORK:** Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350; **WASHINGTON:** 8304 Professional Hill Drive, Fairfax, VA 22031, (703) 573-4115; **CHICAGO:** 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433; **LOS ANGELES:** 18004 Sky Park Circle, Suite 100, Irvine, CA 92714, (714) 250-0164; **SAN FRANCISCO:** 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, (714) 250-0164

PROGRAMMERS/ANALYSTS CICS IMS DB/DC DB 2/SQL ADABASE NATURAL PACBASE

ADVANCED TECHNOLOGY SYSTEMS is a computer consulting firm headquartered in the Washington, D.C. metropolitan area with offices in Alabama, Georgia, NY, and Virginia. We are looking for individuals skilled in any two of the above. Please send your resume to: ADVANCED TECHNOLOGY SYSTEMS, INC., 8229 Boone Blvd., #300, Vienna, VA 22180, ATTN: Karen. Phone: (703) 761-3200.

Computer recruitment advertising activity*



SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATABASE
CW CHART

Rolm PBX market uncertain

Supply exceeds demand for IBM's CBX II after 9751 announcement

BY JONATHAN L. ROGERS
SPECIAL TO CW

Twice in the past 16 months, users of the Rolm CBX II have had to evaluate a major IBM change of direction.

IBM made the CBX II family obsolete by introducing the 9751 CBX in October 1987, while in December 1988, Siemens AG bought Rolm's manufacturing, research and development.

In the four months following the 9751 announcement, retail market values for the VSCBX, CBX II 8000 and CBX II 9000 RB 74 plunged 33%, 23% and 18%, respectively. Supply has exceeded demand for CBX II systems because of their "fork-lift upgradability" to the 9751 CBX. The switch, except for the peripherals, must be swapped out in order to migrate to the 9751 CBX.

Many CBX II users who have been compelled to improve functionality or expansion capacity

have been courted vigorously by AT&T and Northern Telecom, Inc.

Astute sales representatives at both Northern Telecom and AT&T have helped end users get a good price for their CBX IIs from the Rolm remarketers. Northern Telecom targeted the CBX II installed base with a \$40 per port rebate for those users willing to switch to an SL-1. While the response to this rebate has not been enormous, it has generated some extra business for Northern Telecom.

Waiting for more

Many Rolm remarketers are waiting for the second shoe to drop as a result of the IBM/Siemens deal.

The remarketers are questioning whether IBM will back out of Rolm altogether to concentrate on multivendor private-branch exchange (PBX)/host connectivity. They are also concerned about which of Siemens' current PBXs the firm will con-

tinue to develop and market (Saturn, 9751 or Hicom), how Siemens will choose to leverage its current distribution assets in Telpus, Inc. and Rolm as well as what kind of support Siemens will give to the secondary market.

85% to 95% of list price. Therefore, remarketers have been on the prowl for Rolmphone laden CBX II systems to satisfy the market demand.

Hard to find

Both the VSCBX and CBX II 8000 have retail market values of 38%, while the CBX II 9000 with Rolmbus 74 has a retail market value of 42%. Currently, few CBX II 9000s with Rolmbus 295 or the Advanced Engine can

tems than CBX IIs because the VSCBX's popular line capacity fulfills the low-end market niche.

In the past five months, current fair market values for Rolm equipment have been in a holding pattern. Values have held steady for the past four months as the initial impact of the 9751 introduction has been fully played out. With an estimated installed base of 18,000 CBX II systems, market values are likely to remain stable until IBM and Siemens reveal more of their plans.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 508-872-8200.

Rolm CBX11 PBXs

Current fair market value

Model	Date shipped	Line size capacity	List price per line	Retail percent of list price
VSCBX 8000	Q1 1984	304	\$605 (100 lines)	38%
CBX II 8000	Q1 1984	600	\$672 (240 lines)	38%
CBX II 9000	Q1 1984	10,000	\$645 (350 lines)	42%

SOURCE: IDC FINANCIAL SERVICES CORP.
CW CHART

Rolm remarketers report that end users are using the secondary market more as a source for parts than for systems. The most desirable Rolm part is the Rolmphone set, for which end users have been paying between

be found in the marketplace.

Demand for the CBX II 9000 RB 74 stems from end users who want to set up a spare kit or add a node to their existing system.

Remarketers have seen more VSCBXs trade to users as sys-

Index

Marketplace	119
Used/Lease/Rent	119
Hardware	123
Software	123
Peripherals/Supplies	123
Graphics/Desk Top Pub	124
Time/Services	124
Bids/Proposals/Real Estate	124
Business Opportunities.....	124
Training	125

The BoCoEx index on used computers

Closing prices report for the week ending Feb. 17, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	\$750	\$875	\$400
XT Model 086	\$1,100	\$1,250	\$900
XT Model 089	\$1,225	\$1,575	\$1,050
AT Model 099	\$1,725	\$2,000	\$1,525
AT Model 239	\$1,850	\$2,100	\$1,800
AT Model 339	\$2,200	\$3,600	\$1,800
PS/2 Model 30	\$1,475	\$1,700	\$1,300
PS/2 Model 50	\$2,350	\$2,600	\$1,900
Compaq Portable I	\$775	\$975	\$600
Portable II	\$2,000	\$2,100	\$1,750
Portable III	\$3,000	\$3,175	\$2,500
Portable 286	\$1,750	\$1,975	\$1,675
Plus	\$1,050	\$1,250	\$900
Deskpro 286	\$2,200	\$2,350	\$1,800
Deskpro 386	\$3,750	\$3,975	\$3,675
Apple Macintosh 512	\$650	\$775	\$550
512E	\$875	\$975	\$600
Plus	\$1,125	\$1,225	\$1,000
II	\$4,300	\$5,100	\$3,800
Apple Imagewriter II	\$375	\$325	\$375
HP Laserjet	\$2,200	\$2,325	\$2,100

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

COMPUTERWORLD'S CLASSIFIED MARKETPLACE

Examines the issues while Computer Professionals examine your message. Call for all the details.

(800) 343-6474

In MA., (508) 879-0700

Used/Lease/Rent

HONEYWELL

LEVEL 6 DPS 6 SERIES 16

• Complete Minicomputer Line
New & Used

• All Peripherals and Terminals

• Upgrades and Features

• Depot Repair Capability

• Honeywell Maintenance
Guaranteed

• Immediate Delivery

Low Prices

• HDS 5 and HDS 7

Compatible Terminals

The Recognized Leader

in Honeywell Minicomputer

Sales and Support



BOUDREAU COMPUTER SERVICES

100 Bearfoot Road.

Northboro, MA 01532

(508) 393-6839

FAX 508-393-3781

LOW PRICES LARGE COMPUTERS

•MF20'S •RP06'S •TU77'S
•DC20'S •DN20'S

ALL DEC MAINTAINED

CALL COLLECT

GRUPO VISA

CUAUHTEMOC 400 SUR

MONTERREY, N.L. MEXICO 64009

PHONE 01(52-83) 40-0240

FAX 01(52-83) 45-4767

NEW ADM™ TERMINALS

FACTORY DIRECT FOR LESS!

ZENTEC Corporation, manufacturer of the ADM terminals (previously manufactured by Lear Siegler), now offers these Models factory direct to you for less!

ADM3E ADM11 ADM11plus
ADM12 ADM12plus ADM1178 ADM220

CALL 800-332-5631 Outside CA or 408-727-7662 X596
FOR PRICING & IMMEDIATE DELIVERY!

FOR PROMPT SERVICE/SUPPORT CALL DOW JONES
SERVICE COMPANY AT 800-532-7373

ZENTEC



Associates Inc

• Data General • Fujitsu
• Data Products • CDC
• Printronix • Zetaco

BUY SELL TRADE

(617) 982-9664

FAX: (617) 871-4456

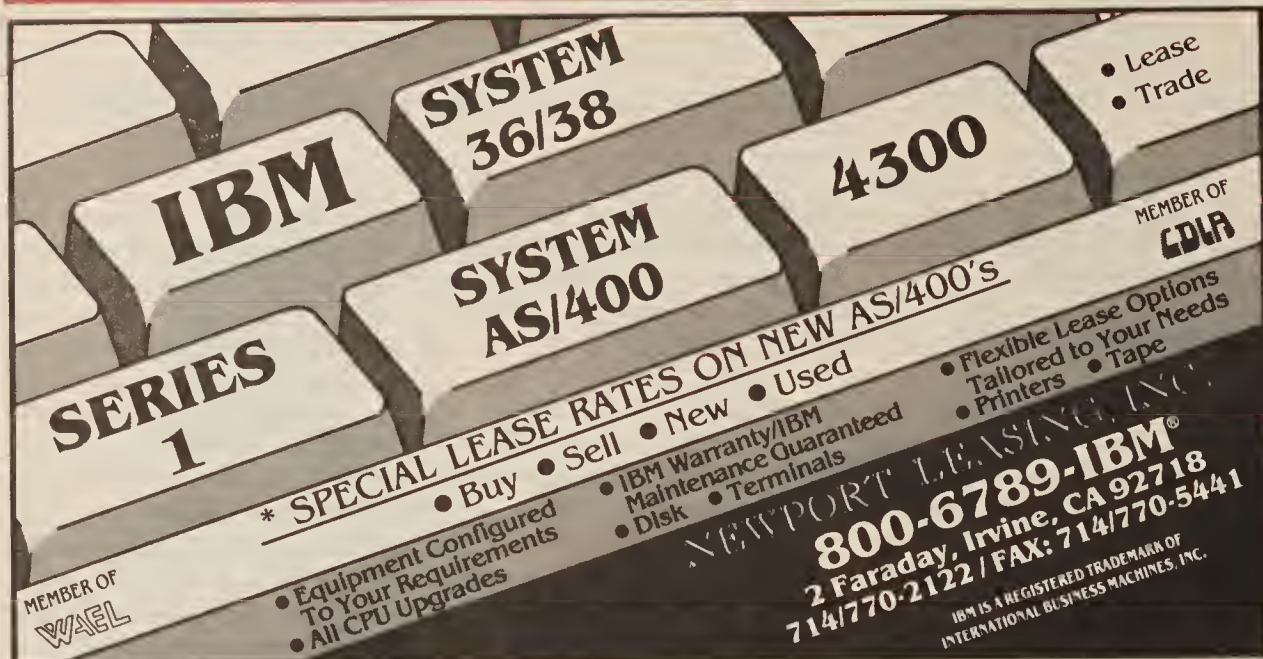
NEW IBM 9370

9375 Central processor 8MB
(4) 9335 disk drives (B) - 3 gigabytes
(2) 9335 disk controllers (A)
(2) 9309 racks (CPU and disk)
4245 printer - 2000 LPM
(5) 3299 terminal multi plexor
(36) 3191 CRT terminals
(2) 3420 tape drives
3803 tape controller

Under IBM Maintenance

Available Immediately

(404) 955-5525



IBM SYSTEM 36/38
IBM SYSTEM AS/400
4300

SERIES 1

*** SPECIAL LEASE RATES ON NEW AS/400's**

- Buy • Sell • New • Used
- Equipment Configured To Your Requirements
- All CPU Upgrades
- IBM Warranty/IBM Maintenance Guaranteed
- Disk • Terminals
- Flexible Lease Options Tailored to Your Needs
- Printers • Tape

NEWPORT LEASING, INC.
800-6789-IBM
2 Faraday, Irvine, CA 92718
714/770-2122 / FAX: 714/770-5441

MEMBER OF **CDLA**

MEMBER OF **WEL**

IBM Unit Record Equipment
Data Modules/Disk Packs
Magnetic Tape/Diskettes



029-082-083-084-085-088
129-514-519-548-557-188

2316-3336(1)&(11)-3348(70)
80-200-300 MB
Disk Packs



Thomas Computer Corp.
5839 W. Howard Chicago IL 60648
800-621-3906 312-647-0880

AS/400
S/38 S/36 S/34
SERIES 1
BUY - SELL LEASE

Systems, Peripherals
Upgrades

Source Data Products Inc.
969C Industrial Road
San Carlos, CA 94070
1-800-333-2669
415/595-7791



**BUY OR SELL
NEW OR USED**

IBM PC * XT * AT * PS/2
COMPAQ * HP * AT&T * WANG
MACINTOSH * APPLE 2

1-800-262-6399

MOTOROLA 68000 SERIES

MC68000G-8	\$8.00
MC68000L-10	\$8.50
MC68010L-8	\$6.00
MC68010LC-8	\$6.00
MC68020RC 12B	\$36.00
MC68020RC 16B	\$40.00
MC68020RC 20B	\$44.00
MC6840P	\$3.00
INTEL 8207-16	\$5.40
MC68881RC 12A	\$38.00
MC68881RC 16A	\$42.00
MC68881RC 25A	\$46.00
HD68450-8	\$15.50
SC87842-L-8	\$27.50
MC68020RC 16B	\$75.00
MC68881RC 12A } Set of 3	\$75.00
8207-2	\$4.90
INTEL 27C256	\$3.25

MINIMUM ORDER \$100.00

TEL (508)768-3480 FAX (508)768-3479



Industrial Electro surplus
The Mauro Group Inc.
245 Western Ave., Essex, MA 01929

Advertise Your Products In The CLASSIFIED MARKETPLACE

Featuring:

- ☐ Used/Lease/Rent
- ☐ Hardware
- ☐ Software
- ☐ Peripherals/Supplies
- ☐ Communications
- ☐ Graphics/Desktop Publishing
- ☐ Time/Services
- ☐ Bids/Proposals/Real Estate
- ☐ Business Opportunities

Reach over 612,000 information systems professionals by placing your company's message in Marketplace.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____

State: _____ Zip: _____

☐ I am enclosing ad material with this form

Ad size:

_____ columns wide x _____ inches deep.

Return this form and advertising material to:

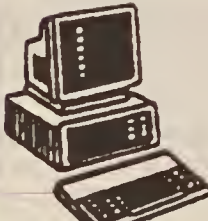
**Computerworld
Classified Marketplace**

375 Cochituate Road, Box 9171
Framingham, MA 01701-9171

or call a representative today
for the details:

(800) 343-6474

(In MA., (508) 879-0700)



**Boston
Computer
Exchange
Corporation**
MA 617-542-4414
FAX 617-542-8849

IBM SPECIALISTS

SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031



COMPUTER MARKETING
of America Inc.

PO BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

**BUY ONE
OF THE BEST**

★ DESKTOP PUBLISHING
**XEROX
STAR 8010**
• 3 WORKSTATION
• DISK • LASER PRINTER

GRUPO VISA
CUAUHTEMOC 400 SUR
MONTERREY, N.L. MEXICO 64000
PHONE 01(52-83) 40-1183
FAX 01(52-83) 45-4767

SIEMENS
2300-1
2200-1
LASERPRINTER
For Sale
Interact GmbH
Tel. 049-69-63 64 10
Tlx. 02627-6997324
Fax. 049-69-63-65-22

**BUY, SELL
LEASE
IBM CPU's**

3081's, 3083's,
3084-QXX, 3090
PILLAR SILENT BLOCK,
PARALLEL CABINET

GTEX Financial Group
(214) 783-1212

CDLA Est. 1978

FOR SALE
IBM S/36 D2M

5360, 1.4gb Disk, 1mb Memory,
Magazine, SLCA, (2) 8809.
All or Part. No Brokers.

D.F. Hartman
Rufus S. Lusk & Son, Inc.
(301) 588-6700

★ Buy ★ Sell ★ Lease ★ Rent
IBM Displaywriters
5525 — OFFICE SYSTEMS
5219 — 5253 — 5258
6670 PRINTERS
SYSTEM/34/36
CDB FINANCIAL, INC.
3520 DILIDO ROAD
DALLAS, TEXAS 75228
800-648-6791
214-324-3491 Member: CDLA

Used/Lease/Rent

WANG

Buy-Sell or Trade

VS PC MVP OIS

Systems in Inventory

VS 7150 / 100 / 85 / 65 / 6 / 5

And Peripherals

4230A • 4230 • LPS-8 • 2256C
PC/AT *WORKSTATIONS

Genesis Equipment
Marketing

Phone (602) 277-8230
Fax (602) 234-0613

* AT is a registered trademark of I.B.M.

VAX RENTALS

MV 3500/3600

MICROVAX II

VAX 6000 SERIES

VAX 8000 SERIES

Systems & Peripherals

- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility

6 Months • 12 Months • 36 Months

BROOKVALE ASSOCIATES

cto Digital Dealers Association

EAST COAST

(516) 273-7777

WEST COAST

(206) 392-9878

minicomputer exchange

since 1973

BUY • SELL

BROKER • SERVICE

sun
microsystems

DEC

DG

Computers • Systems
Peripherals

CAD/CAE Equipment

Call ... 408-733-4400
FAX: 408-733-8009

IBM

BUY • SELL • LEASE

Member
Computer Dealers
& Lessors Association

CDIA

**SYSTEM
36/38**

**43XX
30XX**

AS/400

**AT&T
VOICE
SYSTEMS**

**SERIES
1**

- Processors
- Peripherals
- Upgrades

DEMPSEY

ASSOCIATES inc.

18377 Beach Blvd., Suite 323
Huntington Beach, CA 92648 (714) 847-8486

(800) 888-2000

PRIME

EXPERIENCED
SYSTEMS AND
PERIPHERALS

BUY-SELL-LEASE-BROKERAGE

NEW PLUG-COMPATIBLE
DISK, TAPE, MEMORY

PLUS
THE FASTEST I/O
AVAILABLE ANYWHERE

1ST SOLUTIONS, INC
11460 N CAVE CREEK ROAD
PHOENIX, AZ 85020
602-997-0997

ASK FOR DON SHIFRIS

Computerworld's Classified Marketplace

**needs only
6 days notice
to run your ad!**

When you're selling, you want your advertising to hit the market quickly and frequently. You can't afford to wait for an issue that's coming out several weeks -- or months -- into the future. With Computerworld, there's no waiting for the next available issue because we've got one waiting for you every week. What's more, your ad can appear in the Monday issue of Computerworld if you order it as late as 6 days prior to the issue (Tuesday).

So if you're selling computer products or services, advertise in the newspaper that won't keep you waiting. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474

(in MA, 508/879-0700)

**COMPUTERWORLD
CLASSIFIED MARKETPLACE**

Where all computer buyers and sellers can go to market.

USED IBM

PC XT AT

PS2

Peripherals

**COMPUTER
TRADERS
INC**

404-980-9233

FAX 404-951-2573

BUY * SELL * LEASE

Reconditioned

**digital™
Equipment**

Whatever your requirements are for Digital Equipment, call CSI first! Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is **eligible for DEC maintenance.**

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

CSI Compurex Systems, Inc.
75 Tosca Dr. Stoughton, MA 02072
CALL TOLL-FREE 1-800-426-5499
In Mass. (617) 344-8600
FAX (617) 344-4199

We Buy & Sell

DEC

Systems
Components

Digital
Computer
Resale

call: 713
445-0082

600 Kenrick Ste C22
Houston, Tx 77060

**Classified
MARKETPLACE**

Where Computer
Professionals Shop
(800) 343-6474
(508) 879-0700

We buy, sell, lease & rent
quality new and used equipment.
And we stand behind it for a year.

digital™

SA482-AA
(New) 2.488 GB
Storage Array
\$48,500.00

LA120-AA
120 cps Dot
Matrix Printer
(Recon) \$400.00
LA50-RA
100 cps 80
column Compact
Printer \$299.00

VT100-AA
(Recon) \$125.00
VT102-AA
(Recon) \$150.00
VT131-AA
(Recon) \$175.00

Long and Short
Term Leases
and Rentals
Available
CALL...

RA82-AA
(NEW)
1 year warranty
\$12,275.00

PDP 11/23
11/24
11/73
11/83
11/84
All Configured
to Your
Needs....

We Pay Cash
for New, Used
and Obsolete
Surplus DEC
Equipment

Wanted
Sun
Microsystems
Computer
Equipment, any
System, any
Configuration

Cluster Equipment
HSC50-AA
HSC70-AA
HSC5x-BA
HSC5x-CA
SC008-AA/AC
CI780-MA
CALL.....

TRIDEX
CORPORATION

Phone: 603-886-0383
Fax: 603-886-0914

375A WEST HOLLIS ST. NASHUA, NH 03061

**WANT TO SELL
NEW**

3 DEC PDP-11 SYSTEM

INCLUDES:

- A) Dec VT101 & KEYBOARD
- B) Dec PDP-11 Computer
- C) Winchester F1/Dr
- D) Isatlii transformer
- E) Dec-#KT24 Mem. Mgt. Brd.
- F) Dec System Unit

**PRICE NEGOTIABLE
MOORE BUSINESS EQUIPMENT**

Dick Leslie
603-742/8455

DATA GENERAL

MV/15000 MOD 8

12 Mb Memory
1.77 Gigabyte Disk
4307-T Tridensity Tape
4373-A Printer
(4) 6215 Serial Printers
(39) D214 Terminals

AMES SCIENCES, INC.
(301) 476-3200
FAX (301) 476-3396

CALL US LAST

GET YOUR BEST PRICE
Then Call
SPECTRA PRODUCTS, INC.
For The Best DEAL
WE
Buy - Sell - Lease - Rent
IBM and DEC™ SYSTEMS
NEW and USED
Other Services Available
Installation and Maintenance
Contract Programming

Call 800-238-6405
IN TN 901-754-6500



SPECTRA PRODUCTS, INC.
1669 KIRBY PKWY. MEMPHIS, TN 38119
"SINCE 1974"

Formerly Computer Brokers, Inc.



FOR SALE OR LEASE

ALL IBM EQUIPMENT INCLUDING

3380-AD4, BD4, AE4, BE4, 3725-1
3480-A22, B22, 3880-3, J23, G23

AVAILABLE NOW

B E A C H
F I N A N C I A L
CORPORATION

2380 Congress Avenue, Clearwater, Florida 34621
(800) 456-5170 (813) 785-2500 FAX #(813) 786-8303

IBM
BUY • SELL • LEASE
NOW

IBM 5381-8Q1
NOW
FOR SALE OR
SHORT-TERM
RENTAL



800-328-7723

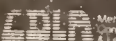
612-829-7445
5555 WEST 78TH STREET
MINNEAPOLIS, MN 55435

BUY • SELL • RENT • LEASE
MEMOREX — TELEX

TERMINALS • PRINTERS
CONTROLLERS

MODELS: 078, 079, 178, 179,
276, 277, 278, 287D2, 387

CALL: PETE DOCKTER
LEASING ASSOC. CORP.
177 SOUND BEACH AVE.
OLD GREENWICH, CT 06870



(203) 637-8500

BURROUGHS
UNISYS

B20 - B7000

A Series - V Series

All Peripherals

Low Lease Rates

Depot Maintenance

LDI/
COMPUTER PROVISIONS
CORPORATION

(216) 687-0307

FOR SALE
2 IBM System 38s

Model 600 - 16 MG
Model 700 - 32 MG

Both CPUs fully loaded
and under IBM maintenance.
No DASD included.

CONTACT: Linda Whilden
or Dave Hogan



(803) 297-6101

HP 3000

ATP's • S/70
7937H • 7933H

Available in Quantity

Processors • Peripherals
Systems

All In Stock - Immediate Delivery

All warranted to qualify for
manufacturer's maintenance

BUY • SELL • TRADE
RENT • LEASE

ConAm Corporation

It's Performance That Counts!
800/643-4954 213/829-2277

NORTHEAST MINICOMPUTER, INC.
55 High Street, Unit 6
Billerica, MA 01862

Wants to Buy Your Surplus
DEC Computer Equipment

We Pay Cash for Your
Unwanted Computer,
Peripherals, Options,
Memory, and Terminals.

Call 1-800-343-8302
or in Mass.
1-508-663-2550.
Or Fax Your List
1-508-667-0718

**Turn Your excess inventory
into Cash \$\$\$\$**



BURROUGHS EQUIPMENT
FOR SALE BY END USER

A15-I

Dual CPU, Dual HDU
96 MB Memory

DISK

7-2 by X B9494-12 sub systems

Including:
B9389 storage controllers
B9399 string controllers
Total of 37 B9494-12 Drives

TAPE

1-4 by 14 BT tape subsystem

Including:
2-BT 3202 tape controllers
14-BT 3288 tape drives, 200 IPS, GCR

COMMUNICATIONS

I/O Expansion Cabinet
2-NSP's, 8 LSP's
16-Quad Line Adaptors

Peripherals sold as
complete subsystems or separately

CONTACT KEVIN O'DONNELL
212-902-6024 OR
JOEL NACHMAN 212-902-7212

PRE-LOVED MAIN-FRAME
FOR SALE

- * Sperry-Unisys 1100/72, 10mb
- * Model 8470 disc drives
- * Model 770 line-printer
- * All fully maintained by Unisys
- * Immediately available
- * All offers considered
- * Further information
Geoff Hamer or Elwyn Walker
University of Wollongong,
PO Box 1144, Wollongong NSW
2500, Australia

- * Phone 61-42-270850
- * Fax 61-42-297768
- * Telex AA29022

Computerworld's
Classified Marketplace

delivers your
message to
companies that plan
to buy your
product or service.

From PCs to minis, main-frames to supercomputers, Computerworld's readers buy products across all ranges of today's computers. So if you're selling, advertise in the newspaper that delivers readers that plan to buy **YOUR** product or service. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474

(in MA, 508/879-0700).

Computerworld's

Classified Marketplace

showcases your ad by product category!

Whether it's used equipment, software, time, services or just about any other category of computer product or service, *Computerworld's* Classified Marketplace is organized to make your ad visible and to make buying your product easy.

Just look!

Computerworld's
Classified Marketplace
Product Categories

used/lease/rent

hardware

software

communications

graphics/desktop publishing

time/services

bids/proposals/real estate

business opportunities

So if you're selling computer products or services, advertise in the newspaper that showcases **YOUR** product or service. Advertise in Computerworld's Classified Marketplace!

For more information, call

800/343-6474

(in MA, 508/879-0700).

COMPUTERWORLD
CLASSIFIED MARKETPLACE

Where all computer buyers and sellers can go to market.

612,000 MIS/DP Professionals
see the **CLASSIFIED MARKETPLACE**
each week

Call for advertising information:

(800) 343-6474
(in MA., 508-879-0700)

Used/Lease/Rent

WANT TO BUY

3720'S • 3725'S

FOR SALE

3720's • 3725's • 3745's

DDC Communication Controller Specialists

Distinctive Dataprocessing Consultants, Inc.

Call us for a quote on your features, upgrades, and line sets!

(214) 869-2214

FAX 214-869-1589

Northeast Terminal & Computer Services

Box 330, Billerica MA 01821, 800-448-0009, (617)273-0670, FAX (508)667-1626

NEW	REFURB	REFURB	REPAIR
VT220.....Call.....350	LA50.....325	Zenith PC.....Call	
VT320.....450.....375	LA75.....675	IBM PC.....Call	
VT330.....1655.....1295	VT100.....150	DEC, Citoh, Wyse, Qume,	
VT340.....2450.....Call	VT101.....175	LeerSiegler,	
LA120.....Call.....595+	VT102.....195	TVI CRT's.....100	
LA100.....995.....595+	VT103.....375	Most Printers.....125	
LA210.....1450.....1045	VT131.....195	Most Keyboards.....65	
WY50.....445.....250	CIT101.....125	LA120 (PS).....95	
WY60.....495.....Call	CIT101E.....175	LA120 (LB).....95	
WY75.....595.....325	CIT220+ w/o kbd.....150	LA210 (PS).....75	
WY85.....625.....375	TVI1950.....195	LA210 (LB).....95	
Visentech, Call	TVI1921.....195	Hard disks.....Call	
	Visual 241.....Call		

Southeast Terminal Corporation

Box 8529, Hobe Sound FL 33475, 800-633-5887, (407)546-1112, FAX (407)546-1137
Depot Repairs, Upgrades, Modules, Leases, On-Site Maintenance, 24 Hour Turnaround

BUY * SELL * RENT * LEASE

3178 3174 3262
3179 3274 3268
3180 3276 3287
3191 3278 4224
3192 3279 4234

Large inventory.
Quick delivery.
Most models and
features in stock. All
machines refurbished.

URS

URS Information Systems, Inc.
One Pope Street
Wakefield, Ma 01880
617-438-4300
CDR Member

HEWLETT - PACKARD

1000 • 3000
9000Computers • Peripherals
Terminals

Buy • Sell • Rent • Lease

EURODATA INC.

2574 Sheffield Road
Ottawa, Canada K1B 3V7
613-745-0921
FAX: 613-745-1172

DEC VAX & AT&T
BUY-SELL-NEW-USEDSystems, Peripherals, Options
available for saleLooking to purchase VAX
and AT&T Systems, HardwareLAKEWOOD COMPUTER
CORP.436 Link Lane
Ft. Collins, CO 80524

(303) 493-6406 FAX: (303) 493-6409

oda

DATA GENERAL
BUY-SELL-TRADESYSTEMS, PERIPHERALS, OPTIONS,
TERMINALS AND PARTSDATA INVESTORS
CORP.6 WEST 18 STREET
NEW YORK, NY 10011

212-675-1000

FAX 212-645-4539

WANTED

OBSOLETE
AND EXCESS
COMPUTER
EQUIPMENT

Top Cash Paid

We purchase all types of obsolete
or excess computer equipment
and peripherals. We pay costs for
all shipments as well as top prices.Call today for a quote
on your system.

COMPU-SCRAP, Inc.

Randolph, MA 02368

(617) 341-2695

Call Collect!

DEC PDP-11
SYSTEMS &
PERIPHERALSBUY
&
SELLTHE
One-Stop
EXCHANGE!• CPUS • TERMINALS
• DISC DRIVES • PRINTERS
• INTERFACES, ETC.dce DIGITAL
COMPUTER
EXCHANGE INC.27773 Industrial Blvd Hayward CA 94545
FAX (415) 887-5590 TLX 709536

Call (415) 887-3100

IF YOU'RE BUYING, WE'RE SELLING

IF YOU'RE SELLING, WE'RE BUYING
IBM SYSTEMS
Buy • Sell • Lease PERIPHERALS

(800) 331-8283

TOLL FREE

(213) 394-1561
CALIFORNIAOcean Computers, Inc.
919 Santa Monica Blvd., Ste. 200
Santa Monica, CA 90401

CDR Member

MEMORY DRAMS AND MODULES SALE

MEMORY DRAMS: MEMORY MODULES:

64K-120 nsec.....\$1.90
256K-80 nsec.....\$7.35
256K-100 nsec.....call
256K-120 nsec.....call
256K-150 nsec.....\$6.25
1 Meg-80 nsec.....\$call
1 Meg-100 nsec.....\$call
256x4-10, 80.....\$call

64x4-10, 12.....\$8.00
VIDEO RAMS.....\$14

Eprom:
27128-200 nsec.....\$call
27256-200 nsec.....\$call
27512-200 nsec.....\$call

1 Meg x 9 SIMM \$195
1 Meg x 9 SIP.....\$call
256 x 9 SIMM.....\$call
256 x 9 SIP.....\$call

STATIC RAMS:
8K x 8-100LP.....\$7
32K x 8-100LP.....\$call

Satic Clnn Module:
256 x 9-80nsec.....\$88

Microprocessors:
8028610/12Mhz.....\$call
V20-10Mhz.....\$call
80386 16/20Mhz.....\$call

Please call for
PLCC, ZIP, SOJ AND ALL IC's.

*Quantity discount available.

*Prices are subject to change without notice.

818-709-4172

Peripherals/Supplies

We asked our customers who had a better WARRANTY
than OSPREY Computer Tape? They told us.....**NOBODY!**

OSPREY COMPUTER TAPE

.....Is the only tape unconditionally guaranteed for life in the industry!.....
If any one of our tapes should fail we will recertify it for a cost to you of \$3.15 and if it does not
pass our stringent test, we will replace it with a brand new tape. It does not matter whether the
tape failed because of poorly aligned tape drives, misuse etc. We will recertify it or replace it for
our tape certification charge of \$3.15 - for the life of the tape. All Osprey Computer Tapes are
brand new and exceed ANSI specifications. **BUY WITH CONFIDENCE - BUY OSPREY.**

2400' Seal \$13.65 2400' EZ Load \$14.25 600' \$7.15
3600' Seal \$20.95 3600' EZ Load \$21.40 1200' \$9.85

PHOENIX COMPUTER (800)727-8273 TERMS: Net 30/3%-10

COMPUTERWORLD'S
CLASSIFIED
MARKETPLACEExamines the issues while
Computer Professionals
examine your message.Call for all
the details.

(800) 343-6474

In MA.,
(508) 879-0700GENUINE
HEWLETT
PACKARDTONERS
\$79⁵⁰Huge Inventory In Stock
For Same Day Shipment! Call• 1-800-22-TONER
• 1-800-228-6637Plotter Supplies At Similar Savings
TONERS PLUS...

Software

SHUSS SYSTEMS INC.

Specializing in UNIX™ Business

Solutions



SYSTEM DESIGN, ANALYSIS
& INTEGRATION
MICRO - MINI - MAINFRAME
CONNECTIVITY
ADMINISTRATION & PER-
FORMANCE ENHANCE-
MENT
CUSTOM SOFTWARE
DEVELOPMENT

TAME THE BEAST

West New York, NJ 07093

(201) 861-5307

UNIX™ is a trademark of AT&T

MVS

PRODUCTS/IDEAS

Major software developer/
marketer is interested in
acquiring or representing
high quality MVS, MVS/XA,
CICS, TSO, VSAM, DASD
performance/productivity
optimizing software utilities,
products or new ideas. We
invite responses in absolute
confidence to Box 35570
Monte Sereno, CA 95030

FREE BUYER'S GUIDE

When you need programmer's develop-
ment tools, Programmer's Connection is
your best one-stop source. We are an
independent dealer representing more
than 300 manufacturers with over 800
software products for IBM personal
computers and compatibles including:
COBOL compilers and utilities, relational
databases, and much more. Call today
to receive a **FREE** comprehensive
Buyer's Guide, and find out why
Programmer's Connection is your best
connection for software tools.

Programmer's Connection

7249 Whipple Ave NW
North Canton, Ohio 44720

US.....800-336-1166

Canada.....800-225-1166

International.....216-494-3781

FAX.....216-494-5260

Telex.....9102406879

CLASSIFIED
MARKETPLACE
Is Here!

Reach Over 612,000
Computer Professionals!
Call for all the details
(800) 343-6474
(508) 879-0700

Hardware

Computerworld's
Classified
Marketplace
works.

Just ask Chuck Youngblood, President of Mountain Market-
ing, a Houston, Texas, company specializing in buying, sell-
ing, and installing the special raised flooring, power sources
and climate control equipment for data centers. "In six weeks
Computerworld's Classified Marketplace pulled customers I
otherwise couldn't have gotten to in six years. No other publi-
cation has delivered the kind of valuable customers Compu-
terworld's Classified Marketplace has."

Or ask any one of the hundreds of companies who success-
fully sell their products to readers of Computerworld's Classi-
fied Marketplace. They'll tell you why they advertise in Com-
puterworld. Because it works.

For more information, Call

800/343-6474

(in MA, 508/879-0700)

WITH 386 PRICES
LIKE OURS WHY
SETTLE FOR A 286.

20 MHz 386 Sys/60MB HD.....\$2,499.95
24 MHz 386 Sys/60MB HD.....\$2,699.95
30 MHz 386 Sys/60MB HD.....\$2,999.95

All systems include:

1MB RAM, 1.2MB or 1.44MB FD,
14-Inch Mono Monitor and Graphics Card,
Serial, Parallel, and Game Ports,
101-Key KB and....

1-Year Warranty.

CALL 508-820-0335
OR WRITE

NCC

46 Singletary Lane
Framingham, MA 01701

PREPAYS AND CODS ONLY.

CLASSIFIED
MARKETPLACE Is Here!

Reach Over 612,000
Computer Professionals!
Call for all the details
(800) 343-6474
(508) 879-0700

Time/Services

COST-EFFECTIVE COMPUTING SERVICES for TODAY and ... TOMORROW

**COMDISCO
COMPUTING
SERVICES CORP.**
provides you with
low-cost, state-of-
the-art computing
services.

- IBM • CPUs and Peripherals
 - Systems Software: MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
 - Application Software: Database Management, Application Development, 4/GLs, Statistical Analysis, Graphics
 - Multiple Communications Methods
 - Technical Support
 - Pricing to fit your needs
- IBM is a registered trademark of International Business Machines Corporation

For more information
Call Jeff Daum
201-896-2030



**COMDISCO COMPUTING
SERVICES CORP.**
P.O. Box 26
Carlstadt, NJ 07072

NEW! IBM MVS-ESA Test and Development Center

- IBM 3090/300E - PR/SM
- IBM 3090/120E - Standalone
- Destructive Testing
- Major Databases - DB2, IMS
- Worldwide Network
- Early Release Site

**Remote Computing
Services**
24 Hours/
7 days a Week

- Dual 3090s - MVS/XA, VM/XA
- DEC-VAX, Wang/VS, HP3000
- Extensive Software Available
- Application Proc'ing
- Cost Effective



**INFORMATION NETWORK
CORPORATION**

For More Information And
Pricing Call
1-800-222-1590, Ext 372

COMPUTING SERVICES

MVS/XA VM/370
DOS/VSE CICS
TSO CMS
DB2 IMS/DBDC
4GL SAS

**MULTIPLE CPUs -
50+ MIPS**

TELENET, TYMNET

**IBM INFORMATION
NETWORK**

**DEDICATED
SYSTEMS
AVAILABLE**

**GIS
INFORMATION SYSTEMS, INC.**

815 COMMERCE DRIVE
OAK BROOK, IL 60521

312-574-3636



Innovative Computer Techniques

COMPUTER SERVICES

IBM 3084

- Batch Processing • Public Network Access
- Timesharing • Laser Printing

Route 202, Raritan, N.J. 08869

201-685-3400

Contact: Joyce Bogaenko

COMPUTER TIMESHARING

- We broker computer time.
- We find your lowest prices
- Nationwide service since 1968.
- All mainframes.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.

**Call Don Seiden at
Computer Reserves, Inc.
(201) 688-6100**

The CLASSIFIED MARKETPLACE

Reach Over 612,000
Computer Professionals
When They Reach For

**COMPUTERWORLD!
(800) 343-6474**
(In MA. (508) 879-0700)

COBOL APPRENTICE

COBOL Source Code
Maintenance and source
restructuring using an
automated AI-tool. This
program may also be used
to migrate COBOL source
across machine dialects

**Symbtech
(508) 460-0335**

NEW AND USED RAISED FLOORING

**Immediate Delivery
Quality Installation**

Raised Computer Floors
One Charles Street
Westwood, NJ 07675
(201) 666-8200
FAX (201) 666-3743

35mm (2x2) COLOR SLIDE DUPLICATES

AS LOW AS

5 1/2¢
per slide

for complete programs.

MAGNO VISUALS
115 West 45 St., New York, N.Y. 10036
(212) 575-5159

Yes, there still is

DEC-20 TIMESHARING

LANDART SYSTEMS INC
65 Broadway
New York, NY 10006
(212) 363-3170

It's the CLASSIFIED MARKETPLACE

**Reach
Computer
Professionals
Where They Shop**

- ☐ Used/Lease/Rent
- ☐ Hardware
- ☐ Software
- ☐ Peripherals/Supplies
- ☐ Communications
- ☐ Graphics/Desktop Publishing
- ☐ Time/Services
- ☐ Bids/Proposals/Real Estate
- ☐ Business Opportunity

**CALL NOW
800-343-6474**
(In MA., 508/879-0700).

**COMPUTERWORLD
CLASSIFIED MARKETPLACE**
Where all computer buyers and sellers can go to market.

Graphics/Desktop Publishing

COMPUTER DATA DISPLAYS
PC Screen to Large Screen
Look to BOXLIGHT—The LCD
Specialist—For the Right System
to Meet Your Needs.

KODAK DATASHOW

+Eiki, Apollo, Chisholm and others.
Prices start at

\$599

Solutions for VGA, EGA, CGA,
all MACs & more
M/C, VISA, AMEX & COD

**BOXLIGHT
CORPORATION**

(415) 892-4744

Computer-Based Presentation Systems
Since 1984

**Your
Advertisement
For:**

- ☐ Used/Lease/Rent
- ☐ Hardware
- ☐ Software
- ☐ Peripherals/Supplies
- ☐ Communications
- ☐ Graphics/Desktop Publishing
- ☐ Time/Services
- ☐ Bids/Proposals/Real Estate
- ☐ Business Opportunities

Can appear here in

**Computerworld's
CLASSIFIED
MARKETPLACE**

(800) 343-6474

(In MA., (508) 879-0700)

Business Opportunities

**OVERSEAS SOFTWARE
COMPANY SEEKS
DEVELOPMENT CONTRACTS**

Managed by former executive of
large U.S. computer vendor. U.S.
based maintenance & support. At-
tractive cost & high quality. Terms
negotiable. Enquiries solicited:

PO Box 4370
Denver, CO 80204

**Go Shopping in...
Computerworld's**

CLASSIFIED MARKETPLACE

**Call for all
the details**

(800) 343-6474

(In MA., (508) 879-0700)

Bids/Proposals/Real Estate

**NOTICE OF INVITATION
FOR QUALIFICATIONS INFORMATION**
Automated Mapping / Facilities Management /
Geographic Information System

The City of Eau Claire, Wisconsin, will receive
Qualifications Information in the office of the
City Purchasing Agent at 203 South Farwell
Street until 4:00 p.m. Central Time on March
23, 1989 for Procurement No. 8901, Automat-
ed Mapping/Facilities Management/Geograph-
ic Information System.

All forms and documents related to this notice
and the procurement it describes are on file
and available from the office of the Purchasing
Agent, 203 South Farwell Street, Eau Claire,
WI 54702-5148. Telephone 715/839-4916.

James W. Fering
Purchasing Agent

**Your Used computer equipment
deserves a second chance.**

If you have used computer equipment to sell,
Computerworld's Classified Marketplace is
the best place to do your selling. That's be-
cause the Classified Marketplace features a
Used/Lease/Rent section to help you market
your equipment to the very people who are
looking to buy.

And when you advertise in *Computerworld*
Classified Marketplace, you reach a total
(ABC-audited) audience of over 612,000 com-
puter professionals who turn to *Computer-*
world for news, information, features - and the
Classified Marketplace - every week.

So give your used computer equipment a sec-
ond chance today. Call 800/343-6474 (in MA,
508/879-0700) to reserve your space.

**Computerworld's
Classified Marketplace
gives you reach to over
612,000 potential buyers!**

And this audience is even verified by the Audit Bureau of Cir-
culations in the only independently audited pass-along survey
of its kind. What's more *Computerworld's* Classified Market-
place penetrates buying companies in all major industries.
That's because *Computerworld's* total audience blankets key
vertical markets that are major users -- and major buyers -- of
computer products and services.

So if you're selling computer products and services, advertise
in the newspaper that delivers over 612,000 potential buyers.
Advertise in *Computerworld's* Classified Marketplace!

For more information, call

800/343-6474
(in MA, 508/879-0700)

COMPUTERWORLD CLASSIFIED MARKETPLACE

Where all computer buyers and sellers can go to market.

The false allure of Hypercard

The capabilities are appealing, but the effort may not be worth your while

BY JANE STEIN
SPECIAL TO CW

Buffeted by relentless hype and exaggerated claims, many otherwise reasonable people have jumped to premature conclusions about the ability of Apple Computer, Inc.'s Hypercard to improve computer-based training (CBT) and streamline its development. Now, however, the product has been in enough hands for sufficient time so that its pros and cons as a real-world authoring tool have become more clear.

Can you develop CBT with Hypercard? Certainly. Can you develop CBT for teaching computer skills? Well, sort of.

Even if there were enough Apple Macintoshes in the business world to make them a practical option for training delivery — and everyone knew how to use them — Hypercard almost certainly would not be the medium of choice for developing traditional CBT for computer skills.

The Macintosh's graphics capabilities do make it possible — although not necessarily easy — to construct screen simulations for many applications, according to Richard Fuchs, a programmer at consulting firm First Reference, Inc. in New York.

But Hypercard cannot read keystroke-per-keystroke input, limiting its usefulness for simula-

tions. It cannot process anything but a multiple-choice question. It cannot do natural-language parsing — “answer analysis” in CBT terminology.

So even in foregoing practice exercises and sticking to conceptual lessons, users run up against a major handicap.

Further flaws

Hypercard has other shortcomings that make it a questionable choice for projects of any size or complexity. One of its open secrets is its slow execution.

“Where Hypercard really bites you in the butt is in testing,” contends Lance Dublin, president of The Training Co. in San Francisco, which has done custom development with the product.

Hypercard has been described as a relational database for ideas, yet it lacks some of the basic features any database administrator would consider essential. It has no built-in global search-and-replace function, although file utility software might do that job.

To link all occurrences of a particular keyword to a corresponding glossary card, for example, the user must walk through the whole construction, inserting the “buttons,” or links, one by one.

The program does not contain — and no one has apparent-

ly yet come up with — a way to edit the button structure. There is no Hypercard equivalent to the CBT authoring system's method of checking dead-end branches.

The glory of Hypercard is that it lets you easily construct vast networks of interlocking cross-references. But the program cannot show you an outline of your work.

There are solutions to some

education at the University of Colorado in Denver, is assembling a library of public domain instructional stacks under the auspices of the Association for Educational Communications and Technology.

Does it make sense to spend so much time and energy applying patches and force-fitting Hypercard to do all those things we take for granted from most of the myriad CBT authoring systems available?

It is a natural instinct when confronted with such a sexy new tool to see first whether it is better, faster or cheaper at doing old tasks. In this case, it is not.

DOES IT MAKE sense to spend so much time and energy applying patches and force-fitting Hypercard to do all those things we take for granted from most of the myriad CBT authoring systems available?

of these problems, of course. Making liberal use of Hypercard's programming language Hypertalk and calls to external programs and subroutines, the canny author can hand-build some basic CBT functions into the application.

Hypercard's irresistible appeal to hackers has led them to inundate bulletin boards with scripts, stacks and calls to external programming. First Reference sells a package of templates and subroutines for CBT development.

Scott Grabinger, professor of

For most data processing and information systems training applications, it is clumsier, slower and ultimately more expensive.

However, for those developers who have come up hard against the inadequacies of traditional CBT and want to explore new approaches, Hypercard is worth considering. It is almost ideal for small-scale, quick-and-dirty training projects of the sort that derive from the occasional need to update people on some new regulation, concept, feature, system fix or the like. Anyone with basic Hypercard com-

petence can throw together a short module in less time than it takes just to get the local CBT authoring expert's attention.

For constructing an essentially noninteractive “guided tour” of the training center, the department or company personnel policies, Hypercard might also be the weapon of choice.

Beat it into submission

If you can wrestle the auxiliary programming into place and are willing to live with the editing and maintenance hassles, Hypercard will give you the basis for a hypermedia system that does much more interesting things with branching and graphics — and does them more easily — than most CBT authoring tools.

But the reason that linear CBT is so dominant is the prohibitive length of time it takes to design anything more elaborate. Even in an established CBT shop, up-front design work eats up the lion's share of time and costs.

“The world's most wonderful authoring tool might knock a third out of your authoring cost, but it is not going to do a thing for your development cost,” said Rob Foshay, director of quality assurance standards at Applied Learning in Naperville, Ill.

“The false allure of Hypercard and hypertext,” Dublin says, “is that you can do great training easy.”

Stein is a free-lance writer based in Arlington, Mass., and is former editor of *Data Training* and *CBT Directions*.

Computerworld Marketplace/Training Editorial Schedule 1989

TRAINING

March 6th - Measuring the worth of training
March 13th - Evaluating training software
March 20th - Educating management about using computers
March 27th - Self-directed learning

MARKETPLACE

March 6th - Where to find industry specific software
March 13th - The secondary disk market
March 20th - PC service centers
March 27th - Used communications processors

COMPUTERWORLD MARKETPLACE PAGES

Where all computer buyers and sellers can go to market.

FREE

CONVERSION GUIDE
Discover new heights in PICK education with DISCOVERY CONSULTANT SERVICES, an Authorized PICK Training Center in Washington, D.C. DISCOVERY offers quality instruction on the PICK and REALITY Operating Systems by Marcie Gebauer, a nationally renowned expert in PICK/REALITY education. Call now and receive a free guide on Conversions and Correlatives plus a 10% discount on any DISCOVERY Course!
DISCOVERY
(703) 476-0837

Educate
your
customers
through
Computerworld's
TRAINING
Section.

For More
Information Call:
(800) 343-6474
In MA, (508) 879-0700

Your Employees Can Learn Software in Half the Time!

ATI on-disk tutorials cut learning time in half. It's a fact — proven by university studies, Fortune 500 firms, and well over 1,000,000 end users. And with prices starting under \$50, it's the most cost-efficient way to get your staff up to speed on popular PC software programs. Discover the best kept secret in computer training. Call today for details:

1-800-421-4827 (Dept. 102)
or 1-213-823-1129 (in California)
Dealer inquiries welcome.



612,000 MIS/DP Professionals see the
TRAINING Section each week
Call for advertising information:
(800) 343-6474
(In MA., 508-879-0700)

SALES OFFICES
Publisher/Fritz Landmann

Vice President/Associate Publisher/Val Landi, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (508) 879-0700

BOSTON: Northern Regional Director/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Paula Wright, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

CHICAGO: Eastern Regional Director/Bernie Hockswender, Midwest Regional Manager/Kevin McPherson, District Manager/Larry Craven, Sales Assistants/Kathy Sullivan, Karol Lange, **COMPUTERWORLD**, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, (312) 827-4433

NEW YORK: Eastern Regional Director/Bernie Hockswender, District Managers/Fred Lo Sapio, Sales Assistant/Linda Pipines, **COMPUTERWORLD**, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

LOS ANGELES: Western U.S. Director/Jan Harper, Southwestern Regional Manager/Carolyn Knox, District Manager/Darren K. Ford, Sales Assistant/Bev Raus, **COMPUTERWORLD**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Western U.S. Director/Jan Harper, Senior District Manager/Emie Chamberlain, District Managers/Michela O'Connor, Alicia Sanbali, Sales Assistants/Chris Kobayashi, Nunt Zekman, Cynthia Yarber **COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Eastern Regional Director/Bernie Hockswender, Southeastern Regional Manager/ Kevin C. Harold, Account Manager/Melissa Christie Neighbors, Sales Assistant/Debra Brown, **COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Eastern Regional Director/Bernie Hockswender, Southeastern Regional Manager/ Kevin C. Harold, Sales Assistant/Brenda Shipman, **COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Eastern Regional Director/Bernie Hockswender, District Manager/Paula Smith, **COMPUTERWORLD**, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Classified Advertising Director/John Corigan, 375 Cochituate Rd., Framingham, MA (508) 879-0700

Midwest Account Manager/Marie Keyes, 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171, (508) 879-0700

New England Account Manager/Paul Bonamico, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

Western Account Manager/Karen Massimino, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES: New England Recruitment Manager/Nancy Percival, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

Mid-Atlantic Recruitment Manager/Warren Kolber, Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Patricia Powers, O'Hare Corporate Tower One, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy, 18008 Skypark Circle, Suite 145, Irvine, CA 92714 (714) 250-0164

South-Atlantic Recruitment Manager/Kathryn Kress, 8304 Professional Hill Dr., Fairfax, VA 22031 (703) 573-4115

Recruitment Account Executives: New England/Andrew Rowe, Mid-Atlantic/Jay Novack, South-Atlantic/Pauline Smith, Midwest/Ellen Casey, Western/Chris Glenn, 1-800-343-6474 or (508) 879-0700

IDG INTERNATIONAL MARKETING SERVICES: Managing Director/Frank Cutitta, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

West Coast Marketing Manager/Leslie Bamer, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.

An IDG Communications Company
Fritz Landmann/President

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, Telex: 95-1153, FAX: 508-872-8564

Vice President/Associate Publisher, Val Landi

OPERATIONS Vice President/Operations, Matthew Smith, Business Manager, Mark Sullivan.

SALES Advertising Director, Carolyn Novack. National Recruitment Sales Director, John Corigan.

Display Advertising Production Manager, Maureen Carter. Classified Operations Manager, Cynthia Delany.

Marketing Services Director, Audrey Shohan. Manager/Marketing Communications, Mary Doyle.

Director of Circulation Management, Maureen Burke. Director of Circulation Promotion, Carol Spach.

PRODUCTION Production Director, Leigh Hometh. Assistant Production Director, Carol Polack.

Production Manager, Beverly Wolff. Art Director, Tom Monahan.

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Comunicaciones S/A, Av. Beigrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: S.W. Chan, Asian Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 5 861 3238. Telex: (780) 72827 (COMWOR HX). FAX: (011) 852 5 86 10953.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR). FAX: (011) 61 2 439 5512.

Austria: Manfred Weiss, CW Publikationen Verlags Ges.m.b.H., Zieglergasse 6, A-1070 Wien, Austria. Phone: (011) 43-93-16-31-0 or (011) 43-93-05-08-0. Telex: 115542 SCH/A. FAX: (011) 43-93-05-08-33.

Brazil: Ney Kruei, Computerworld do Brazil Ltda, Praca Floriano, 19/26 Andar, CEP:20031 Rio de Janeiro. Phone: (011) 55 21 240 8225. Telex: (391) 21 30830 BR.

Denmark: Preben Engell, Computerworld Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (855) 31566. FAX: (011) 45 154 56 14.

France: Francois Chaussonniere, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F. FAX: (011) 33 14 241552.

Hungary: Oezso Futasz, Computerworld Informatika Co., Krt. Pf. 386, 1536 Budapest, Hungary. Phone: (011) 36 1 228 458. Telex: (861) 22 6307 (KSH H).

Italy: Umberto Costamagna, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39-2-2613432. Telex: (843) 335318. FAX: (011) 39 2 282 0886.

Japan: Oick Yamashita, Computerworld Japan, Akasaka Omotemachi Bldg., Minato-Ku, Tokyo 107. Phone: (011) 81 3 551 3882. Telex: (781) 252-4217. FAX: (011) 81 3 582 7239.

M. Nakamura, IDG Communications, Japan, c/o Marcom International, Inc., Akasaka Center Building, 1-3-12 Moto-akasaka, Minato-ku, Tokyo 107, Japan. Phone: (011) 81 3 403-8515. Telex: (781) 27941 (reps for all CW Publishing publications except Computerworld Japan).

Mexico: Henry Morales, Computerworld Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 O.F. Colonia Roma, 06700 Mexico. Phone: (905) 514 4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The

Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Martin Taylor, Computerworld Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland, New Zealand. Phone: (011) 64-9-779-902. Fax: (011) 64 9 774 604.

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, 0576, Oslo 5, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N). FAX: (011) 47 268 0152.

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 B14 0044. Telex: (716) 222214 (CCW CN).

Spain: Paco Zabala, CW Communications, S.A., Rafael Calvo, 1B, 4B, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 45522 (CW E). FAX: (011) 341 419 61 04.

Sweden: Bengt Mamfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8 67 91 80. Telex: (854) 14904 9 (NOVACW). FAX: (011) 46 8 65 3132.

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710 (CWCI CH). FAX: (011) 41 1 55 1135.

Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26 57B, Room 503#1, Fu Hsin, S. Road Sec 1, Taipei, Taiwan, R.O.C. Phone: (011) 886 2 721 4302. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications). FAX: (011) 886 2 731 0420.

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 BUT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346 (THEPUB G). FAX: (011) 44 1 405 2347.

United Kingdom: Euan Rose, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE, United Kingdom. Phone: (011) 44 926 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications). FAX: (011) 44 926 512948.

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Tore Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX: (011) 58 2 724970.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munich 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350. (COMW O). FAX: (011) 49 89 3 60 86109.

IDG COMMUNICATIONS/INC.

Patrick J. McGovern
Board Chairman

Axel Leblols
Chief Executive Officer

William P. Murphy
Vice President/Finance

Computerworld is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 90 computer publications in 33 countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S *Computerworld Argentina*; ASIA'S *Communications World*, *Computerworld Hong Kong*, *Computerworld Southeast Asia*, *PC Review*; AUSTRALIA'S *Computerworld Australia*, *Communications World*, *Computerworld PC World*, *Australian Macworld*; AUSTRIA'S *Computerwelt Osterreich*; BRAZIL'S *DataNews*, *PC Mundo*, *Micro Mundo*; CANADA'S *Computer Date*; CHILE'S *Informetica*, *Computacion Personal*; DENMARK'S *Computerworld Denmark*, *PC World Denmark*, *CAD/CAM World*; FINLAND'S *Mikro*, *Tietoviriko*; FRANCE'S *Le Monde Informatique*, *Distributique*, *InfoPC*, *Telecoms International*; GREECE'S *Computer Age*; HUNGARY'S *Computerworld SZT*, *PC Mikrovilag*; INDIA'S *Dataquest*, *PC World India*; ISRAEL'S *People & Computers Monthly*, *People & Computers Weekly*, *SBM Monthly*; ITALY'S *Computerworld Italia*; JAPAN'S *Computerworld Japan*, *Semicon News*; MEXICO'S *Computerworld Mexico*, *PC Journal*; THE NETHERLANDS' *Computerworld Netherlands*, *PC World Benelux*; NEW ZEALAND'S *Computerworld New Zealand*, *Computerworld Norge*, *PC World Norge*; PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld*, *China Computerworld Monthly*; SAUDI ARABIA'S *Arabian Computer News*; SOUTH KOREA'S *Computerworld Korea*, *PC World Korea*; SPAIN'S *Cimworld*, *Computerworld Espana*, *Commodore World*, *PC World Espana*, *Comunicaciones World*; SWEDEN'S *Computer Sweden*, *MikroDatort*, *Svenska PC World*; SWITZERLAND'S *Computerworld Schweiz*; UNITED KINGDOM'S *Computer News*, *ICL Today*, *Lotus*, *PC Business World*; UNITED STATES' *Amiga World*, *CD-ROM Review*, *CHO*, *Computer Currents*, *Computerworld*, *Digital News*, *Federal Computer Week*, *80 Micro*, *Focus Publications*, *InfoCider*, *InfoWorld*, *Macintosh Today*, *Macworld*, *Computer + Software News* (*Micro Marketworld/Letbar-Friedman*), *Network World*, *PC Letter*, *PC World*, *Portable Computer Review*, *Publish*, *PC Resource*, *Run*; VENEZUELA'S *Computerworld Venezuela*; WEST GERMANY'S *Computerwoche*, *Information Management*, *PC Welt*, *PCWoche*, *Run/Run Specials*.

ADVERTISERS INDEX

Andrew Network Products 42,88
Apollo Computer 47,48-49,50
AT&T.....18-19,52-53,89,106-107

B.I. Moyle & Associates.....23
BMC Software.....76-77

Cadware Group 79
Chicago Soft.....93
Cincom Systems.....99
Compuserve Data Technologies.....64
Cullinet Software.....66-67
CW Circulation 105
CW Conference 104
CW Testimonial 17,102,126

Data General Corp.....24
Data Group 36
Dell Computer Corp. 74-75
Digital Equipment Corp. 32-33
Dylakor Design Group 64

EMC Corp.....96
Epson America.....69,70-71

Fortex.....65

Gandalf 54

Hewlett Packard.....55,57,59,61

IBM 44-45,100-101
Information Builders 22
Informix Software Inc.....90-91
Integral Systems 68
Interface Systems 25
IPL Systems 41,43

JYACC 78

Knowledgeware.....34
Leasametric.....10

Micro Focus 31
MSA C4
Multi-Tech Systems 60

NCR 38-39
NEC.....C3
NEC Home Electronics 94-95
North Ridge Software Inc.....16
Novell.....108-109

Oracle Corporation 5,11,13,

Prime Computer 81,82-83
Progress Software.....72

Rabbit Software 27,28-29
Racal-Milgo.....40,92-93
Radio Shack 98
Realla.....46
Relational Technology Inc.....36-37

SAS Institute.....14-15
SDI.....36
Software Engineering of America.....9
Software Spectrum 12
Sybase Inc.....62
Syncsort.....3
Systems Center,Formerly VM Software,Inc. 7

3 Com Corporation.....56,58

Unitech Software,Inc. 88

Walker Interactive 73
Wyse Technology Corp.....30

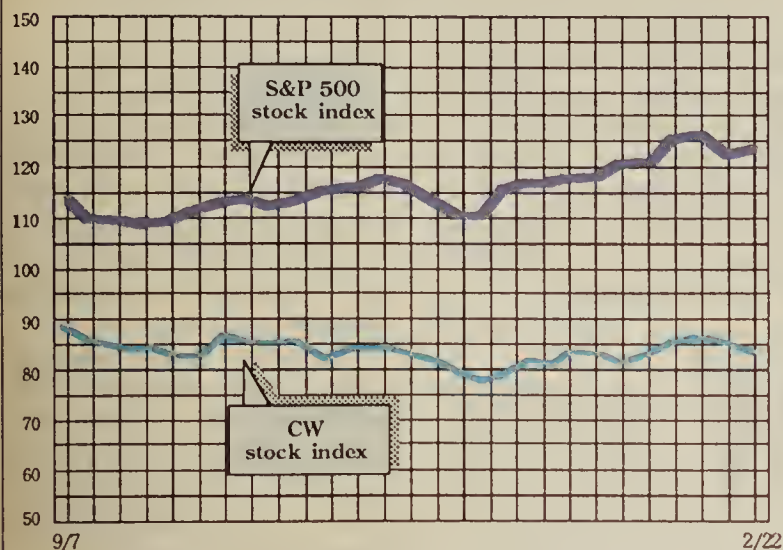
Zenith Data Systems.....26

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Look for These
Upcoming Special
Editorial Features
in Computerworld

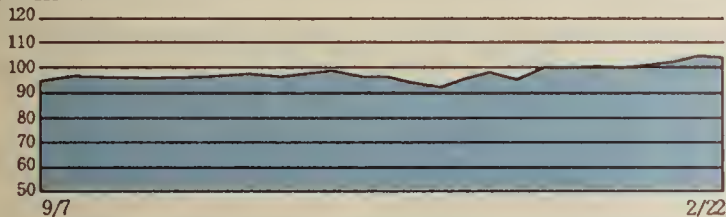
Issue Date	Executive Reports	Product Spotlights
Mar. 6	Special Feature: Systems Integration Executive Report: MIS in the Federal Government	
Mar. 13		Disaster Prevention & Recovery
Mar. 20	Human Resource Development	
Mar. 27		CASE Products
Apr. 3	Cost Control & Justification	
Apr. 10	Special Report: TBA	
Apr. 17	Restructuring MIS — Distributing Resources	
Apr. 24	Managing after a Merger	

STOCK TRADING INDEX

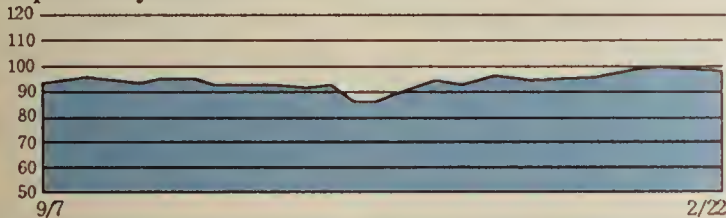


Indexes	Last Week	This Week
Communications	104.7	103.7
Computer Systems	98.9	98.6
Software & DP Services	113.7	112.2
Semiconductors	57.7	56.5
Peripherals & Subsystems	80.0	77.9
Leasing Companies	94.2	94.6
Composite Index	85.4	84.4
S&P 500 Index	123.0	124.8

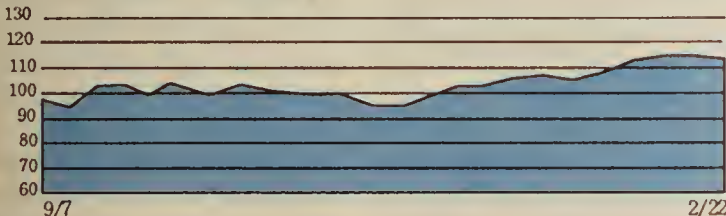
Communications



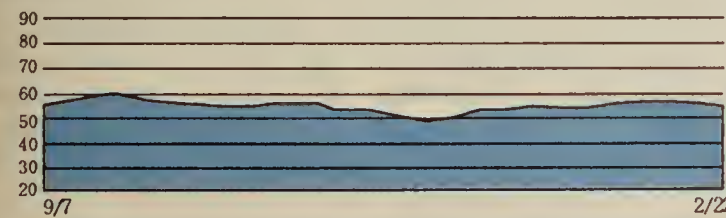
Computer Systems



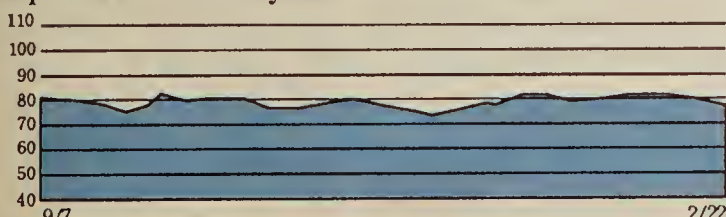
Software and DP Services



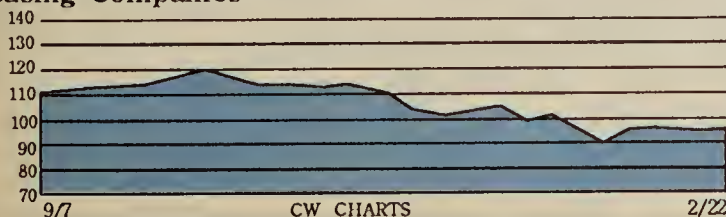
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEB. 22, 1989

EXCH	52-WEEK RANGE (I)	PRICE CLOSE FEB. 22 1989	WEEK NET CHNG	WEEK PCT CHNG
------	-------------------	--------------------------	---------------	---------------

Communications and Network Services

N	AMERICAN INFO TECHS CORP	53	42	50.875	-1.1	-2.2
N	ANORW CORP	22	13	20.25	-0.8	-3.6
N	ARTEL COMM CORP	3	1	2.125	0.1	8.3
N	AT&T	33	24	30.5	-0.8	-2.4
N	AVANT GARDE COMP INC	3	0	0.625	-0.1	-9.2
N	AVANTEK INC	8	4	5.5	0.0	0.0
N	AYOIN CORP	17	13	15.625	0.3	1.8
N	BELL ATLANTIC CORP	78	64	73.375	-2.1	-2.8
N	BELLSOUTH CORP	44	37	41.25	-1.1	-2.7
N	COMPRESSION LABS INC	5	3	3.75	0.1	3.4
N	COMPUTER NETWORK TECH	2	1	1.594	0.0	0.0
N	CONTEL CORP	48	31	46	-0.5	-1.1
N	DATA SWITCH CORP	10	5	5.125	0.0	0.0
N	DIGITAL COMM ASSOC	38	17	20.75	-2.0	-8.8
N	DOYNE CORP	24	17	19	0.3	1.3
N	FIBRONICS INTERNATIONAL INC	5	3	4.625	-0.3	-5.1
N	GANDOLF TECHNOLOGIES	8	5	4.875	-0.1	-2.5
N	GENERAL DATA COMM INOS	8	3	5	-0.1	-2.4
N	GTE CORP	47	34	44.875	-0.1	-0.3
N	INFOTRON SYS CORP	14	7	11.25	-0.8	-6.3
N	ITT CORP	56	44	53	-1.1	-2.1
N	M A COM INC	11	8	8.5	0.4	4.8
N	MCI COMMUNICATIONS CORP	27	10	24.125	-1.0	-4.0
N	NETWORK EQUIPMENT TECH INC	23	14	20.75	1.0	5.1
N	NETWORK SYS CORP	12	8	9.25	-0.3	-2.6
N	NORTHERN TELECOM LTD	20	15	15.825	-0.3	-1.8
N	NOVELL INC	37	19	36.25	1.3	3.6
N	NYNEX CORP	71	61	68.825	-0.8	-0.9
N	PACIFIC TELECOM GROUP	35	27	33.75	-0.1	-0.4
N	PENRIL CORP	5	3	4.5	-0.1	-2.7
N	PLESSEY PLC	45	25	44.375	-0.4	-0.8
N	SCIENTIFIC ATLANTA INC	18	10	13.875	-0.4	-2.8
N	SOUTHWESTERN BELL CORP	44	34	43.625	0.8	1.7
N	3 COM CORP	28	18	26.75	0.4	1.4
N	U S WEST INC	63	50	60.375	-0.5	-0.8

Computer Systems

N	ALLIANT COMPUTER SYS	9	3	3.25	-0.1	-3.7
N	ALPHA MICROSYSTEMS	8	4	8.5	-0.5	-7.1
N	ALTOS COMPUTER SYS	13	7	7.5	0.4	5.3
N	AMDAHL CORP	28	18	19.375	-0.3	-1.3
N	APOLLO COMPUTER INC	17	7	8.75	0.9	11.1
N	APPLE COMPUTER INC	48	35	36.75	0.5	1.4
N	BOLT BERANEK & NEWMAN	19	10	9.825	-0.1	-1.3
N	BRITTON LEE INC	4	1	3.188	-0.1	-1.9
N	COMPAQ COMPUTER CORP	78	47	68.5	-2.3	-3.2
N	COMPUTER AUTOMATION INC	14	3	5.375	-0.3	-4.4
N	COMPUTER CONSOLES INC	13	5	12.5	0.0	0.0
N	CONCURRENT COMP CORP	7	4	5.375	1.3	31.9
N	CONTROL DATA CORP	31	16	21	0.6	3.1
N	CONVEX COMPUTER CORP	11	7	11	0.1	1.1
N	CRAY RESH INC	89	53	58.25	-0.1	-0.2
N	DAISY SYS CORP	12	6	5.75	0.1	2.2
N	DATA GEN CORP	28	17	18.75	-0.4	-2.0
N	DATAPoint CORP	6	4	4.25	-0.1	-2.9
N	DELL COMPUTER CORP	13	8	8	-0.5	-5.9
N	DIGITAL EQUIP CORP	127	86	113.625	-1.8	-1.5
N	FLOATING POINT SYS INC	5	2	3.125	-0.1	-3.8
N	HARRIS CORP	33	25	28.25	-0.6	-2.2
N	HEWLETT PACKARD CO	66	44	56.375	-1.8	-3.0
N	HONEYWELL INC	77	57	65.75	-0.8	-1.1
N	IBM	131	104	123.375	-3.6	-2.9
N	INFORMATION INTL INC	18	11	14.75	0.3	1.7
N	IPL SYS INC	7	1	8	-0.4	-5.9
N	MAI BASIC FOUR INC	21	7	9.875	-0.6	-8.0
N	MATSUSHITA ELEC INOL LTD	230	169	185.375	-6.6	-3.5
N	MEGADATA CORP	4	1	1.563	0.0	0.0
N	MENTOR GRAPHICS CORP	37	23	33.5	0.0	0.0
N	NBI INC	7	1	1.75	-0.1	-6.7
N	NCR CORP	70	51	81.25	1.9	3.2
N	PRIME COMPUTER INC	21	12	19.5	0.0	0.0
N	PYRAMID TECHNOLOGY	19	8	17.75	0.3	1.4
N	SILICON GRAPHICS CORP	25	14	18	-0.5	-2.7
N	STRATUS COMPUTER	32	21	30.5	1.3	4.3
N	SUN MICROSYSTEM INC	21	13	18.875	-0.9	-4.4
N	SYMBOLICS INC	2	1	1.813	0.1	7.4
N	SEQUENT COMPUTER SYS INC	25	14	22.625	-0.8	-3.2
N	TANDEM COMPUTERS INC	22	12	19.375	-0.5	-2.5
N	TANON CORP	49	38	43	-0.5	-1.1
N	ULTIMATE CORP	16	8	10.875	-0.3	-2.2
N	UNISYS CORP	39	25	29.375	0.3	0.9
N	WANG LABS INC	17	8	9.5	-0.3	-2.6

Software & DP Services

N	ADVANCED COMP TECH	4	1	2.688	-0.2	-6.5
N	AMERICAN MGMT SYS INC	19	12	17.625	-0.1	-0.7
N	AMERICAN SOFTWARE INC	18	11	17.5	0.1	0.7
N	ANACOMP INC	12	5	5.375	-0.3	-4.4
N	ANALYSTS INTL CORP	15	7	14.25	0.0	0.0
N	ASHTON TATE	31	20	22.75	-0.3	-1.1
N	ASK COMPUTER SYS INC	18	11	16	-0.3	-1.5
N	AUTOODESK INC	34	22	29.5	-1.5	-4.8
N	AUTO DATA PROCESSING	47	35	37.75	-1.5	-3.8
N	BMC SOFTWARE INC	17	8	15	-0.9	-5.5
N	BOOLE & BABBAGE INC	14	8	13.25	0.3	1.9
N	BUSINESSLAND INC	15	8	12.5	-2.1	-14.5
N	COMPUTER ASSOC INTL INC	40	24	36.875	0.4	1.0
N	COMPUTER HORIZONS CORP	12	7	8.5	-0.8	-8.1
N	COMPUTER SCIENCES CORP	55	38	50.625	-1.1	-2.2
N	CORPORATE SOFTWARE	15	9	10.5	0.0	0.0
N	COMPUTER TASK GROUP INC	17	10	13	-0.3	-1.9
N	COGNOS INC	9	5	7.375	-0.6	-7.8
N	COMSHARE INC	28	14	25.5	0.5	2.0
N	CULLINET SOFTWARE INC	9	4	4.875	-0.4	-7.1
N	OUQUESNE SYS INC	24	16	23.75	0.8	3.3
N	GENERAL MTRS (CLS E)	47	37	43.75	-1.0	-2.2
N	HOGAN SYS INC	8	3	4.688	-0.1	-1.3
N	INFORMIX CORP	25	7	10.25	-0.1	-1.2
N	INTELLICORP INC	4	2	3.75	0.0	0.0
N	KEANE INC	27	7	25	2.0	8.7
N	LOTUS DEV CORP	34	15	22.125	0.1	0.6
N	MANAGEMENT SCI AMER	14	6	8	0.1	1.8
N	MICRO PRO INTL CORP	4	2	1.875	0.0	0.0
N	MICROSOFT CORP	71	45	60	-2.3	-3.8
N	MORINO ASSOCIATES INC	20	12	20	-0.3	-1.2
N	NATIONAL DATA CORP	32	19	24.875	1.1	4.7
N	ON LINE SOFTWARE INTL INC	14	4	4.75	0.3	5.6
N	ORACLE SYS CORP	25	14	22.5	-0.9	-3.7
N	PANOSOPHIC SYS INC	19	12	15	0.0	0.0
N	PHOENIX TECHNOLOGIES INC	19	12	17.875	0.1	0.7
N	POLICY MGMT SYS CORP	27	21	25.75	-0.3	-1.0
N	PROGRAMMING & SYS INC	18	10	17	0.3	1.5
N	RABBIT SOFTWARE INC	3	2	2.625	0.0	0.0
N	RELATIONAL TECHNOLOGY INC	21	12	15.375	-0.4	-2.4
N	REYNOLDS & REYNOLDS CO	29	17	27.5	0.5	1.9
N	SEI CORP	22	15	18.75	0.0	0.0
N	SHAREO MEO SYS CORP	27	14	18	0.0	0.0
N	SAGE SOFTWARE INC	9	5	8.875	0.3	2.9
N	SOFTWARE PUBG CORP	27	11	18.75	-2.4	-12.4

A	STERLING SOFTWARE INC	9	5	6.5	-0.1	-1.9
N	SUNGARO DATA SYS INC	20	14	15.5	-0.5	-3.1
N	SYSTEMATICS INC	34	26	32.75	0.5	1.8
N	SYS. SOFT INC	26	9	23	-0.3	-1.1
N	VM SOFTWARE INC	21	12	19.625	-0.5	-2.5

Semiconductors

N	ADV MICRO DEVICES INC	17	7	8.825	-0.1	-1.4
N	ANALOG DEVICES INC	16	10	12	0.0	0.0
N	ANALOGIC CORP	10	6	8.875	-0.3	-3.4
N	CHIPS & TECHNOLOGIES INC	21	11	17	-1.3	-6.8
N	INTEL CORP	37	19	25.25	-1.0	-3.8
N	LSI LOGIC CORP	14	8	10.875	-0.5	-4.4
N	MICRON TECHNOLOGY INC	26	15	19.875	1.4	7.4
N	MOTOROLA INC	55	36	43	-1.9	-4.2
N	NATL SEMICONDUCTOR	15	8	8.375	-0.1	-1.5
N	TEXAS INSTRS INC	57	35	41.125	-1.0	-2.4
N	WESTERN DIGITAL CORP	18	12	12.625	-0.4	-2.9

Peripherals

N	ALLOY COMP	5	2	2	-0.1	-5.9
N	AM INTL INC	6	3	5.75	0.0	0.0
N	AST RESH INC	17	7	7.5	-0.1	-1.6
N	AUTO TROL TECH CORP	6	4	5	0.0	0.0
N	BANCTEC INC	12	6	11.5	0.1	1.1
N	CIPHER DATA PRODS INC	11	7	10.75	0.3	2.4
N	COGNITRONICS CORP	4	2	3.25	0.0	0.0
N	CONNOR PERIPHERALS	10	7	7.875	0.0	0.0
N	DATAPRODUCTS CORP	18	8	16.875	0.5	3.1
N	DATARAM CORP	9	8	8.625	0.3	3.0
N	EASTMAN KODAK CO	50	39	48	0.6	1.3
N	E M C CORP MASS	19	4	4.25	-0.9	-17.1
N	EMULEX CORP	12	6	10.875	-0.3	-2.2
N	EVANS & SUTHERLAND	22	13	16.75	0.5	3.1
N	ICOT CORP	5	2	2.25	-0.3	-10.0
N	INTERLEAF INC	21	6	8.25	0.5	8.5
N	IOMEGA CORP	5	2	1.938	-0.6	-22.5
N	LEE DATA CORP	4	3	2.75	-0.1	-2.2
N	MASSTOR SYS CORP	4	2	2.813	-0.3	-8.2
N	MAXTOR CORP	18	6	9.125	0.1	1.4
N	MICROPOLIS CORP	30	6	6.5	0.4	6.1
N	MINISCRIBE CORP	14	4	4	-1.0	-20.0
N	MINNESOTA MNG & MFG CO	70	57	66.625	-0.8	-1.1
N	PERSONAL COMPUTER PRODUCTS INC	7	4	4	-0.1	-3.0
N	PRIM CORP	3	1	0.75	-0.2	-20.0
N	PRINTRONIX INC	11	7	7.375	-0.3	-3.3
N	QMS INC	12	6	8.375	-0.4	-4.3
N	QUANTUM CORP	16	10	16	2.3	16.4
N	RECOGNITION EQUIP INC	12	6	9.875	-0.1	-1.3
N	REXON INC	9	4	7	0.4	5.7
N	SEAGATE TECHNOLOGY	23	7	11.25	-0.6	-5.3
N	STORAGE TECH CORP	4	1	1.625	-0.3	-13.3
N	TANDON CORP	3	1	1	0.0	0.0
N	TEKTRONIX INC	30	19	21.5	-0.3	-1.1

Five join in low-cost Unix effort

BY WILLIAM BRANDEL
CW STAFF

Marking Unix's 20th anniversary, five leading workstation software vendors will launch a fully loaded, low-cost Unix software package for Intel Corp. 80386-based systems to undercut comparable offerings from the company that made Unix popular — Sun Microsystems, Inc.

Digital Equipment Corp., The Santa Cruz Operation (SCO), Relational Technology, Inc., Tandy Corp. and Locus Computing Corp. reportedly plan to make their announcement tomorrow at Uniforum 1989 in San Francisco. The package will be called Open Desktop, sources briefed on the event said.

The package will include a 386-based system from Tandy; DEC's application programming interface, XUI; SCO's latest version of AT&T's Unix System V, Release 3.2; Relational Technology's DBMS/386; and Locus' Merge.

Excluding the Tandy machine, the package's license will cost \$995 for two users and an additional \$500 for an upgrade to support three or more users, sources said.

Making contributions

A DEC spokesman confirmed the arrangement, stating that DEC would not be selling the package but will offer its XUI as a technological contribution.

The companies are merging their product offerings in an effort to standardize personal computer software for 386-based systems.

In addition to the products listed, the package will support industry standards including X Window System, Sun's Network File System, Transmission Control Protocol/Internet Protocol and the Open Software Foundation's standard user interface when it becomes available.

"Sounds like a damned good deal to me," said Tim Rudolph, senior systems engineer at Hanscom Air Force Base in Bedford, Mass. "The price-point is intriguing. If I had \$10,000, I'd buy one myself."

Sources said the package is being targeted at the government and academic markets. The software will run on any 386-based PC and will require a 100M-byte hard disk and at least 6M bytes of memory. The package's total cost will be approximately \$9,000. A comparable system from Sun would reportedly range in price from \$15,000 to \$20,000.

IBM's 'open' vow questionable

ANALYSIS

BY AMY CORTESE
CW STAFF

A year after IBM placed its AIX on a pedestal next to Systems Application Architecture (SAA), questions regarding the equality of the two product lines still abound.

Since modifying its long-held proprietary views and officially sanctifying its version of Unix as a strategic product at Uniforum 1988, IBM has gone to great lengths to prove it is serious about Unix and open systems. The marketing giant created a division dedicated to AIX and won its biggest endorsement from the Open Software Foundation, which will base its candidate for an industry-standard Unix operating system on AIX.

On the downside, IBM's disclosure earlier this month that it will be late with AIX/370, signaled possible troubles in bringing AIX to the mainframe. Its RT workstation has yet to command any respect in the market.

While some observers say IBM will be a success in the Unix world simply because it is IBM, others are not so sure.

IBM has gone to great lengths to prove its commitment to Unix, but many still call it a shotgun wedding. "Proprietary systems will always be IBM's systems of choice," contended Bob Djurdjevic, president of Annex Research in Phoenix, Ariz.

For IBM, "Unix is a choice of necessity," he said. Necessity or not, many insist IBM will be a force to be reckoned with.

"IBM will be quite a major player in the Unix market," said Judith Hurwitz, senior editor at Patricia Seybold's Office Computing Group in Boston. Hurwitz cited the commercial appeal of AIX features such as disk mirroring and — even more important — the marketing clout of IBM. "While other vendors will have to beg and plead with software developers to port applications," she said, "everyone will be writing for AIX."

Hurwitz said she foresees AIX playing an interesting role for IBM. While IBM is constrained by the specifications of SAA and the need to remain compatible with older systems, there are no precedents for AIX. Therefore, IBM is free to experiment and bring new technology into AIX, she said. However, AIX will have to stick to standards designated by X/Open Consortium Ltd. and other standards bodies.

A unified AIX family spanning operations from the desktop to the mainframe is at the core of IBM's AIX strategy. However, most analysts downplayed the significance of IBM's postponed mainframe AIX offering.

While analysts debate the potential demand for mainframe Unix, AIX/370 is a real consideration for some customers. Carl Bond, vice-president of informa-

tion systems at Farm Bureau Mutual Insurance of Michigan, has installed IBM RTs at all of his insurance agencies and plans to eventually link them to a central host processor — possibly an IBM mainframe running AIX. So far, he said, he is satisfied with AIX and indications of IBM's continued commitment.

WHILE SOME observers say IBM will be a success in the Unix world simply because it is IBM, others are not so sure.

Hurwitz said she does not think that IBM's delay of AIX/370 signals major problems. Since AIX was developed for the RT, there are many changes required to port it to the mainframe. "IBM has leverage no one else has — they can afford to be a few months late," she said. "For another company, that would be disastrous."

David Card, an analyst at Framingham Mass.-based market research firm International Data Corp., suggested that AIX/370 was delayed because it was not a priority for IBM. "There is not much demand for AIX/370. Unix is really a low-end market right now," he said.

However, Djurdjevic argued

that the opportunity cost for IBM will be significant. Amdahl already has a foothold in the mainframe Unix market, and Unix is helping the IBM-compatible vendor sell mainframes, especially in Europe, he said.

Amdahl Corp.'s latest release of UTS, its version of Unix, is scheduled for third-quarter availability. Unlike AIX, which runs as a guest operating system under VM, UTS runs natively and therefore achieves better performance.

Djurdjevic contended that there is more at issue for IBM than Unix. Unix is a new application area for the 9370, and IBM was counting on that to spark sales of the midrange mainframe, he said.

In the near term, IBM's biggest challenge may be to provide a powerful family of workstations. RT enhancements are slated for this year, but a significantly improved follow-on is anticipated in 1990 or 1991.

John Logan, vice-president at market research firm Aberdeen Group in Cambridge, Mass., does not see IBM becoming a major Unix force. While he said he views AIX as a "world-class product," the problem is not the implementation but IBM's hardware platforms and lack of corporate-wide commitment to AIX. Comparing IBM's RT success with other Unix vendors, he said, "It looks like IBM will be a follower in all classes."

As Logan summed it up, "The final cruel irony may be that AIX succeeds in the form of OSF, while IBM has little market presence in its own name."

Unisys U series casts shadow in Unix arena

BY ROBERT MORAN
CW STAFF

In the midst of layoffs last week, Unisys Corp. broadened its Unix-based offerings with three new models in its midrange U series. Analysts viewed the announcement — together with the formation of a Unisys Network Computing Group (NCG) and the branding of its systems as X/Open compatible — as the company's signal that it will become a major force in the commercial Unix market.

Unisys now offers Unix-based systems that span the gap from the desktop to multiprocessors. The X/Open branding ensures that the systems will comply with the Common Applications environment specified by the X/Open Consortium Ltd.

"Unisys has quietly become a formidable player in the Unix market through its OEM strategy," said Peter Kastner, vice-president of Aberdeen Group, a

market research firm in Boston. "They can now address anybody's requirements at a competitive price."

Unisys' largest growth area has been its Unix-based systems, said Robert Cameron, an analyst at Dataquest, Inc. in Boxboro, Mass.: "By creating the Network Computing Group, Unisys has isolated its best performers into one successful group." The tactic, he said, "inadvertently points out failures in the company's other lines of business."

Indeed, while touting the \$800 million in revenue that the company garnered from Unix last year, Paul Ely, president of the new group, said that companywide layoffs (see story page 103) will affect the NCG. Although Ely would not be specific, he said the layoffs would be less severe within the new organization.

The two largest models, the U 6000/70 and the U 6000/80, come to Unisys through an OEM

arrangement with Sequent Computer Systems, Inc. in Beaverton, Ore. Slated to become available in July, the U 6000/70 will cost from \$110,000 to \$400,000. The U 6000/80 will cost from \$195,000 to \$1 million and will support up to 400 users.

The entry-level U 6000/30 was built by Convergent Technologies, Inc., now a Unisys division following its acquisition in December. The U 6000/30 supports up to 16 users. Available immediately, its price ranges from \$11,000 to \$30,000.

The new models, together with the company's older U 6000/50, are based on Intel Corp.'s 80386 processors and run software based on AT&T's Unix System V and MS-DOS.

From here to there

Clifford Rushton, manager of data processing at the forest products division of the Federal Paper Board Co. in Augusta, Ga., has ordered 20 U 6000/30s.

Already a user of the U 6000/50, Rushton will place the new models at remote sites. "With the systems, we will be able to distribute processing to local sites and upload data to the main office without worrying

about applications portability," he said.

He added that the high-end processors give him confidence that he will not be dead-ended in the midrange. Furthermore, he said, because of MS-DOS, microcomputer users in distributed sites can use their own programs and share files, almost like using a local-area network.

Unisys also introduced Decnet Interconnect, a software package that allows midrange processors to connect to Digital Equipment Corp. proprietary Decnet networks. Set to be available between April and June, prices for the systems will range from \$2,000 to \$8,000.

Unisys added IBM Token-Ring capability to its PCI software, which allows IBM Personal Computers and compatibles running MS-DOS to share files, applications and resources with a central data repository maintained on a U series processor. Slated to be available in April, prices will range from \$950 to \$5,500.

Unisys also announced that U series processors can now run Sun Microsystems, Inc.'s Network File System, which will range from \$3,500 to \$9,000.

Sun heats up Sparc strategy

Low- and high-end workstations bolster Sun's line to counter DEC threat

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. will have a double-barreled response to the increasingly competitive reduced instruction set computing (RISC) arena this week with low-end and high-end workstations, according to sources briefed on the products.

Sun will introduce a workstation based on its Scalable Processor Architecture (Sparc) running at 8 million instructions per second (MIPS) and priced at about \$7,000, the sources said. At the same time, Sun will unveil a high-end Sparc-based system offering 20 MIPS in processing speed. That system will be priced at about \$30,000.

A Wall Street analyst briefed on Sun's offerings said the firm is looking to pepper its installed base with front-end units. "Sun

can go back into those sites and then sell them a high-end server with a hefty price tag," he said.

Sun is expected to show both systems privately to selected customers at the Uniforum 1989 show in San Francisco. Company officials declined to comment on the systems.

RISC rivals

Industry watchers said the barrage of products is Sun's response to heated competition in the workstation market, especially the emergence of RISC-based systems from competitors such as Digital Equipment Corp.

Additionally, Sun will bolster its Motorola, Inc. processor-based line of workstations later this spring with a 68030-based system that costs about \$6,000, sources said.

An existing system in the Sparc line, the Sun-4/110, costs \$19,950 and runs at 7 MIPS.

The rollout of a low-end system will likely require that Sun make price adjustments.

Meanwhile, Sun is developing a Sparc system with a processing speed of between 40 and 50 MIPS, the sources said. That system, which will require a cool environment to operate, is expected to be unveiled before the end of this year, they added.

According to industry watchers, Sun is looking to pull away from DEC, which passed Apollo Computer, Inc. to become No. 2 in the workstation market last year.

"When Sun turns around, it's looking at DEC," said Jennifer Johnson, senior analyst of the technical market at Framingham, Mass.-based market research firm International Data Corp. "It's true that DEC has just introduced its first RISC machine, but it's clear they intend to fill out their line."

RISC software gets 88open thumbs-up

BY J. A. SAVAGE
CW STAFF

BURLINGAME, Calif. — A 29-member consortium organized last year to promote Motorola, Inc.'s reduced instruction set computing (RISC) architecture announced 26 software packages last week to accompany the first RISC-based hardware products from Data General Corp., Sanyo Business Systems Corp. and Icon International, Inc.

Promising rigorous enforcement of its binary compatibility standard (BCS), 88open Consortium Ltd. has placed its seal of approval on the products, which range from operating systems (including Pick Systems' Pick) to compilers, relational databases and office automation.

Nearly all the products are scheduled for availability in late

1989, although DG and Sanyo are announcing hardware products that are expected this summer (see story page 1).

Motorola is leveraging its RISC architecture through the consortium, while RISC rivals Sun Microsystems, Inc. and Mips Computer Systems, Inc. are using more informal software development channels — Sun through third parties and Mips through an independent software company that serves as an intermediary for third-party developers.

Roger Cady, director of 88open, said that Motorola is expected to be far ahead of Sun and Mips in market share by 1993, according to research conducted by Santa Clara, Calif.-based Infocorp.

However, Infocorp analyst Jeanette Sill-Holeman said that

prediction depended on Motorola's chip being accepted as the RISC architecture for Apple Computer, Inc.'s hardware. "If not, they'd end up a rather distant third," she said.

Eyes peeled

The consortium is eyeing the shrink-wrapped Unix software market for Motorola RISC computers, much like the current market for off-the-shelf MS-DOS software for personal computers, Cady said.

"We'll use Open Software Foundation standards as appropriate," said Bob Anundson, executive director of 88open.

The consortium has developed BSC for Motorola's chips and has worked with AT&T to develop a Unix application binary interface, according to Ed Staiano, executive vice-president of Motorola.

The consortium's technical staff, Anundson explained, audits software compliance to its standards and will issue its seal of approval for software that passes the certification program.

Data General

CONTINUED FROM PAGE 1

family of minicomputers erodes.

"This is their future," said Judy Hurwitz, a senior analyst at Patricia Seybold's Office Computing Group, a market research firm in Boston. "This is DG's first step toward a comprehensive switch-over to a full Unix strategy. They're essentially building a new company from within."

The entry-level workstation is reportedly based on a 16-MHz 88000 chip and is capable of pro-

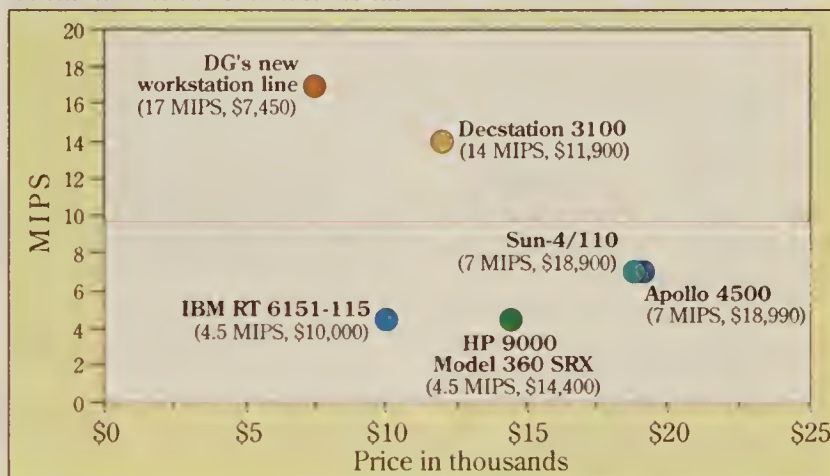
Ressinger, an analyst at Duff & Phelps Selected Utilities, Inc., a market research firm in Chicago.

One factor assisting this will be the machines' adherence to the 88open Consortium Ltd.'s binary compatibility standard (BCS). The BCS calls for all software written for any 88000-based computer to employ a common interface to executable or binary programs, thus allowing for compatibility across systems from many vendors.

Commercial users of the new line, including those in the financial, manufacturing, government and health care fields, will likely

One-upmanship

In the battle to deliver the most MIPS for the fewest dollars, DG's announcement this week should top DEC's price/performance benchmark established last month



CW CHART: FRANK C. O'CONNELL

cessing more than 17 MIPS. It will offer 4M bytes of memory, expandable to 28M bytes; a monochrome 20-in. 70-Hz monitor sporting 1,280- by 1,024-pixel resolution; and built-in Ethernet and small computer systems interface capabilities, sources said.

The machine will be available this summer starting at \$7,450; qualified developers will be able to obtain a model in the spring for \$4,900. A color version of the same system with 8M bytes of memory and a 19-in. screen will cost \$11,995.

A higher performance model featuring Motorola's 20-MHz 88000 chip and 8M bytes of memory will sell for \$10,850. A similar version with a color monitor will begin at \$14,995. All the machines will be able to run DOS and Unix.

The company's most Sisyphean task is likely to be in establishing itself in the Unix market, in which companies like NCR Corp. and Bull H. N. Information Systems, Inc. enjoy large user bases. DG's machines will run DG/UX, its implementation of AT&T's Unix System V.

The early bird

DG will reportedly make a big push to get the machines into the hands of software developers so that applications can be ported to the new line. Analysts see this as key in helping DG establish a foothold in the market and secure new customers. "You can't sell a machine if you can't do anything with it," said P. Martin

need high-performance machines on their desktops.

Early assessors of the machines said they were impressed with the RISC technology at the low price. "We can't wait to get one," said Al Rocco, a spokesman at Westwood, Mass.-based Medical Information Technology, Inc., which has a network of 400 terminals attached to nine DG minicomputers. "Our network slows down as we add more terminals; the RISC machine should take care of that."

But some analysts say that lack of volume production of Motorola's chips may slow DG's ability to make a quick drive into the market. "I'm skeptical that they can make much of this because there aren't a lot of 88000 chip sets around to put the machines into volume production," said John J. McManus, vice-president of Thomson McKinnon Securities, Inc. in New York.

DG is also scheduled to introduce single- and dual-processor servers. The entry-level single-processor version will include 16M bytes of memory, offer 20 MIPS of processing power and sell for \$59,000. A dual-processor model will start at \$94,000.

DG's rollout will be the plum in the batch of recent announcements featuring the Motorola chip, which was announced last April [CW, April 25]. Last week, Sanyo Business Systems Corp. and Icon International, Inc. announced the Model 8000, which boasts 15 MIPS of performance and will reportedly be available this summer for \$155,000.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1988 by CW Publishing/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: back issues, if available, may be purchased at \$2.00 per issue, plus postage. Call (800) 669-1002.

Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970.

Reprints (minimum 100 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 669-1002.

Requests for missing issues will be honored only if received within 60 days of issue date.

Subscription rates: \$2.00 a copy: U.S. — \$48 a year; Canada — \$110 a year; Central & So. America — \$130 (surface), \$250.00 (airmail) a year; Europe — \$195 a year; all other countries — \$295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

TRENDS

Executive information systems

The executive of 1992 will be armed with the right information to make better, more informed decisions, a study conducted by International Data Corp. (IDC) suggests. The study shows that the use of executive information systems (EIS) is on the rise.

Executives surveyed by the Framingham, Mass.-based market research firm indicated that EIS is gaining importance and is increasingly needed.

EIS will be the fastest growing segment of the overall decision support system (DSS) market, IDC predicts.

DSS assists in management problem solving by using techniques such as modeling, data management, forecasting, reporting and graphics.

EIS is targeted at high-level management and was designed to provide timely, pertinent information to aid in decision making, thereby eliminating the need to sift through lengthy reports.

According to IDC estimates, the EIS market will mushroom from just \$1 million in 1984 to \$115 million in 1992, outpacing other DSS areas such as financial modeling, spreadsheet and analysis and other application software.

However, the financial modeling category will also grow, retaining its stature as the largest DSS submarket. The aggregate DSS market is predicted to grow to more than \$450 million by 1992.

EIS represented only 11% of the DSS market in 1987. By 1992, IDC predicts that it will make up a full quarter of that market.

EIS is still fairly new to many executives. While sales of EIS packages are reportedly mounting, they are slowly being put to use by busy executives. (See story, page 31).

An IDC survey of executive ratings of personal computer functions showed that executives still favor spreadsheets and financial modeling over EIS.

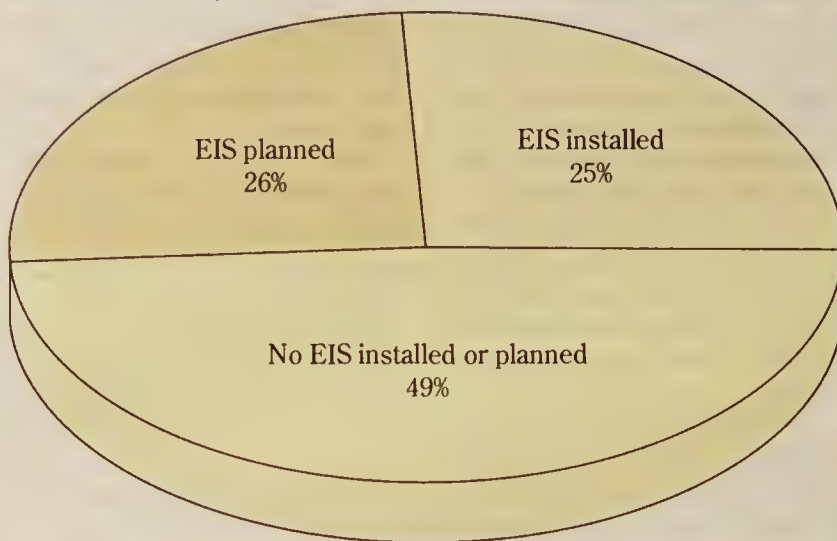
But advances in technology are making EIS easier for executives to use and learn, which should speed the technology's adoption.

EIS' bright future is further evidenced in a forthcoming IDC survey of 500 IBM sites, in which slightly more than half of the respondents indicated that they had EIS installed or that they planned to install such systems.

AMY CORTESE

Many users planning for EIS

PERCENT OF SITES (BASE OF 500 IBM SHOPS SURVEYED)

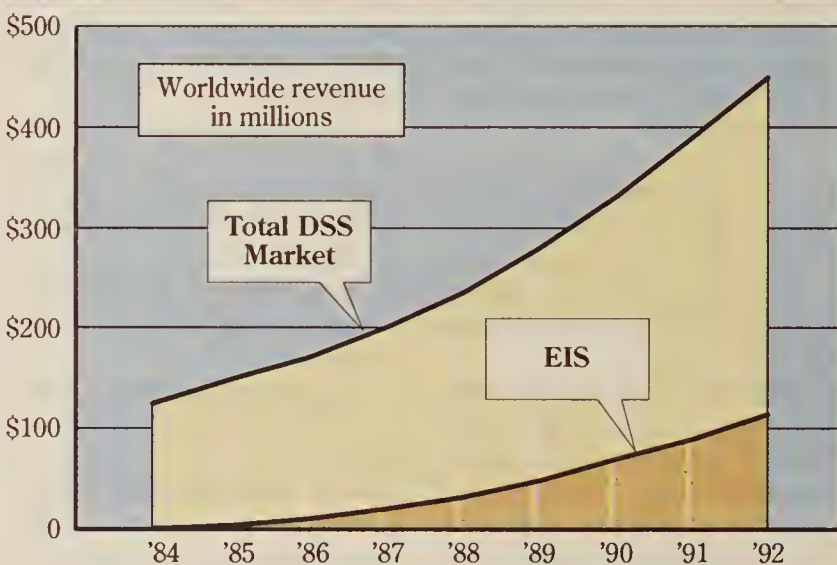


Outlook appears positive

NUMBER OF RESPONSES (BASE OF 46 FIRMS SURVEYED THAT USE OR PLAN DSS)

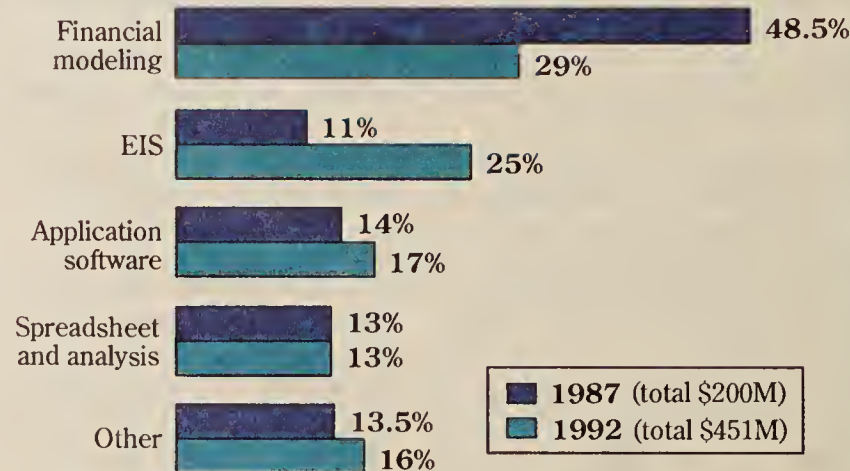


EIS to be 25% of DSS market by '92



Dollars will rival financial modeling

DSS MARKET SEGMENTATION BY APPLICATION



SOURCE: INTERNATIONAL DATA CORP.
CW CHARTS: JOHN YORK

INSIDE LINES

The winds are blowing around DEC . . . and people who are hugging trees may find their shelter blown down. That was the message Ken Olsen delivered during a mid-February product marketing confab, according to reports filtering down through DEC. The major corporate goal, according to the Decvine, is financial growth of 20% annually, no employment growth and price-cutting of 30% during the next three years. Among other tidbits making the rounds: Olsen, catching up to opinion outside the company, seemed unimpressed by DEC's marketing efforts and wants "innovation, leadership and aggressiveness;" DEC will develop a strategy to educate the Big Eight accounting firms about DEC products; and VMS can be ported to a reduced instruction set computing (RISC)-based VAX.

We'll withhold judgment. A DEC official refuted last week's Inside Lines item that said DEC was negotiating with Tandy Corp. to build a Micro Channel-based PC. However, the source of the information maintains that the DEC official made the statement, adding that "DEC did not want to close out its customers from Micro Channel products."

Server stew thickens. In its partnership deal with Microsoft and Sybase, Ashton-Tate is reportedly enjoined from selling any OS/2-based multiuser database management system other than the SQL Server all three are developing. But that will not stop Ashton-Tate from hedging its bets by supporting a server from Interbase, in which it has an equity stake. The server will be distributed by Cognos.

A Novell approach for Gupta. Today, Novell and Gupta Technologies are expected to announce a joint marketing and technology agreement that will give Novell a two-pronged database strategy. For users who wish to run DBMS software on a nondedicated file server, Novell will push its own Netware SQL, XQL and Btrieve. For those opting for a dedicated database server, Novell will offer up Gupta's SQLbase, a more robust server system. The move is seen as aimed squarely at Microsoft, which is pushing its own SQL Server and LAN Manager operating system.

For whom the bell tolls. Sources close to DEC say the firm will officially retire the Vaxstation II/GPX on March 31. The workstation was introduced in January 1986 and was the first workstation in the industry to use MIT's X Window System. A DEC spokesman said the move would not surprise him, as it is shadowed in price/performance by the Vaxstation 3100, 3200 and 3500 models.

Privileged partner? Although IBM is late with AIX/370 for its customers, that does not affect the Open Software Foundation, says OSF Chairman David Tory. The OSF is using AIX as the core product for its alternative to an AT&T-standard Unix, and Tory said the original schedule is being met by IBM. The OSF has been receiving AIX Release 2 code and expects to receive Release 3 code in March.

Spotting Sparcs. The consortium of chip vendors to promote Sun Microsystems' Scalable Processor Architecture (Sparc) has been incorporated. Sparc International, Inc. will be led by Cypress Semiconductor's Roger Ross, who also pioneered Motorola's RISC efforts before joining Cypress. According to Cypress' chief executive, T. J. Rodgers, Sparc International has been awarded the legal right to use the Sparc name. The next step is to ensure compatibility between all available versions of Sparc and the Unix operating system, Rodgers said. Sparc International is also composed of representatives from Fujitsu, Texas Instruments, LSI Logic and Bipolar Integrated Technology.

Will the next Bill Gates surface in the LAN market? Public offerings for high-tech companies have paled since Seattle Willy was made a billionaire by Wall Street, but Network General Corp., owner of the Sniffer diagnostic package, saw its planned \$35 million public offering bid up to \$50 million by investors. With that and HP's buy into 3Com, it must be time for The Wall Street Journal to start writing about LANs. But if you want to see the story straight, give those tips to News Editor Pete Bartolik by calling our hot line at 800-343-6474 or 508-879-0700.

THIS IS NO PLACE FOR SPACE INVADERS.



A business desk is no place to play games with space. So NEC built three serious machines with one mission in mind: optimum performance in a minimum space. Meet PowerMate® 1, PowerMate 1 Plus and PowerMate SX.

The PowerMate 1 and PowerMate 1 Plus get right down to business. They're industry standard. Powerful. Affordable. Both PCs race through spreadsheets, graphics and hundreds of other general office applications. And with six option slots and memory

expandable to over 10MB, they're ready for the inevitable result of all that tough work. Growth.

The PowerMate SX is for those who want more power. And want it now. Here's 386 power without the 386 price. Which means it can run the most advanced software applications in the world, including Windows™/386, as well as any 286-based applications.

All three machines are part of a complete family of top quality PCs, each compatible with popular networks and industry standard hardware peripherals. All proudly backed by NEC, the \$22 billion leader in computers and communications.

If you're ready to do more business in less space, call 1-800-NEC-INFO (in Canada, 1-800-343-4418). Today.

NEC



PowerMate 1
Intel® 286 microprocessor
10/8 MHz

PowerMate SX
Intel 386SX™ microprocessor
16/8 MHz

PowerMate 1 Plus
Intel 286 microprocessor
12/8 MHz

INTERNAL
REVENUE
SERVICE

**OUR HUMAN RESOURCE SYSTEM
MAKES SURE THIS INSTITUTION GETS
EXACTLY WHAT IT DESERVES.**

On January 1, 1989, when other human resource systems rolled to a halt, ours was rolling into action. Just like the new tax laws.

You see, while Congress was putting new Technical Corrections into effect, we were ready and waiting to apply solutions for section 89 discrimination testing.

That's just one of the reasons why 44% of big business, big enough to have

their own packaged mainframe human resource systems, is smart enough to get its software from Management Science America, Inc.

Not only does our system pay accurately, it calculates taxes based on effective dates and produces reports and magnetic tape reporting in state and federal required formats.

Not only is the payroll correct, it is

automatically integrated to benefits administration capturing contributions, wage bases, FICA wages and hours on a plan year basis.

Then there's the added dividend of MSA's ongoing maintenance program. Which pays because you'll never have to rewrite your human resource programs to comply with new or adjusted federal regulations.

For more talk about a system that's never taxing, call Robert Carpenter at (404) 239-2000.

MSA
The Software Company